

Benthic Macroinvertebrate Data Analysis

Prepared for

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INTRODUCTION

Harford County's Department of Public Works (DPW) collects benthic macroinvertebrates twice per year from three stream stations as a requirement of their NPDES permit. The lower station is just upstream at Tollgate Road, the upper station is downstream from Brentwood Park Drive, and the middle station is between them and accessed thru the Woodland Hills Development (Figure 1).

BENTHIC DATA ANALYSIS

Benthic macroinvertebrate data from the three stream stations was entered into a database, and a suite of metrics calculated. Metric selection and data analysis followed the Maryland Biological Stream Survey (MBSS) program guidance documents (Stribling et al 1998). Nine metrics were used to calculate the Index of Biotic Integrity (IBI) for the Piedmont or Non-Coastal Plain eco region.

1. Total taxa represent the total number of distinct taxa present in the sample.
2. EPT taxa represent the number of taxa in the sample that are included in the insect orders Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera.
3. Ephemeroptera taxa represent the number of mayfly taxa present in the sample.
4. Diptera taxa represent the number of "true" fly taxa, including midges, present in the sample.
5. Percent Ephemeroptera represent the percentage of mayfly present in the sample.
6. Percent Tanytarsini represent the percentage of Tanytarsini midges present in the sample.
7. Intolerant taxa represent the number of taxa sensitive to disturbances with tolerance values between 0-3 present in the sample.
8. Percent tolerant taxa represent the percentage of the sample tolerant of disturbances with tolerance values 7-10.
9. Percent collectors represent the percentage of the sample that feeds on detrital deposits or loose surface films.

Scores for the IBI were calculated as the mean of the individual metric scores. This average metric value, which ranges between one and five, was used to rate the condition of the benthic community. MBSS has adopted four categories for the IBI with narrative ratings as follows:

Good:	IBI score 4.0 to 5.0
Fair:	IBI score 3.0 to 3.9
Poor:	IBI score 2.0 to 2.9
Very Poor:	IBI score 1.0 to 1.9

These overall scoring criteria were predicated on a careful evaluation of many reference sites in Maryland (Stribling et al 1998).

To evaluate Harford County's monitoring stations against the "best achievable" urban reference condition, an urban reference index (EA 2001) was calculated for comparison

with the IBI. Based on MBSS data from streams in urban areas, IBI scores were calculated from 46 locations. Urban locations are defined as sampling stations, which have greater than 50 percent urban land use in the catchment areas. The urban reference index (URI), which was calculated from the 90th percentile IBI score, was 2.56. Presently, the recommendation is to recalculate the URI when three more years of MBSS data are available. The IBI scores for each station were compared to the URI and a percent of the urban reference was reported for the stations. As an effort to identify candidate stations for stream restoration efforts, a rating was assigned to each station based on the percent of the URI. Using the MBSS scoring criteria, a direct proportion was calculated by dividing the highest IBI scores in each narrative category by the URI (2.56) to arrive at ratings based on the URI. Using this approach, a score of 2.0 was the threshold value between fair and good. Therefore, a score of greater than 2.0 (or 78 percent of the URI) was considered approaching an attainable urban benthic community. Scores less than 2.0 indicate areas that would benefit most from restoration.

In addition to the selected metrics used in the IBI, MBSS (Roth et al 1999) also recommends calculating the Hilsenhoff Biotic Index (HBI), which is an indicator of biological tolerance to various pollutants. MBSS has adopted four categories for the HBI with narrative ratings as follows:

Good:	HBI score 0 to 4.5
Fair:	HBI score 4.51 to 6.5
Poor:	HBI score 6.51 to 8.5
Very Poor:	HBI score 8.51 to 10.0

The HBI provides an additional means of applying threshold values to determine degradation, due to organic pollution, which could be an issue in the County's streams.

The benthic data analysis results are reported in the following appendices:

- Appendix A – Phylogenetic list, tolerance values, and functional feeding groups of macroinvertebrates
- Appendix B – 1997-2004 Taxa list and abundance of macroinvertebrates
- Appendix C – Selected metrics, IBI, and HBI scores of taxa: 1997-2004

A summary of IBI, URI, and HBI results are reported in the following tables:

- Table 1 – Spring Sampling Event
- Table 2 – Fall Sampling Event

The statistical analysis results are reported in the following figures and tables:

- Temporal trends using regression analysis were performed on the IBI and HBI in Figures 2 – 5. Trends showing significant regressions at the 95% significance level are displayed on each graph. Separate regressions were performed for each station for the spring and fall seasons because an analysis of variance (ANOVA) conducted at the 95% significance level found significant seasonal differences in both IBI and HBI scores.
- The average IBI and HBI scores among the three stations were compared using the Wilcoxon Signed-Rank test in Table 3.

RESULTS

Based on scoring criteria established by MBSS, the Index of Biotic Integrity (IBI) values were calculated and scores assigned to each sampling station. During the spring, some stations were rated very poor including the upper station in 1998, middle station in 1999, the middle and upper stations in 2000, and the upper station in 2003. The lower and middle stations were rated fair (3.07) in 2002 and the remaining stations were all rated poor (1.96-2.78) during other years sampled (Table 1). No temporal trends were evident according to the results of the regression analysis at each station of the spring IBI scores (Figure 2).

In the fall, the lower, middle and upper stations were rated very poor (1.00–1.81) according to the calculated IBI values from 1997-1999. Stations that were rated as poor (1.96-2.56) included the lower station from 2000-2004, the middle station in 2000 and the upper station in 2002 and 2004. The middle station was rated as fair (3.07) in 2000. The regression analysis of the fall IBI scores at each station did not indicate temporal trends in the data (Figure 3).

The Wilcoxon Signed-Rank test was used to investigate differences in IBI among the three stations. The results of the Wilcoxon Signed-Rank test indicate that IBI scores in the upper station are significantly lower (i.e. biologically impaired) than the IBI scores at the middle and lower stations (Table 3). According to the IBI, the ratings of very poor to poor indicate generally degraded biological condition at most stations during most years. The stations were rated lower in the fall than in the spring season. In the spring, slight improvement in scores occurred in 2001, 2002 and 2004 compared to past years.

The IBI data were compared to the urban reference condition in Maryland using the urban reference index (URI). In the spring, the lower station (1998, 2003), middle station (1999-2000), and upper station (1998-2000, 2003) were rated as needing improvement (53.5-76.7%; Table 1). All other stations and years during the spring were rated as approaching an attainable urban benthic community (79.6-120.1%). Some improvement was indicated in 2001, 2002 and 2004 in the spring compared to 1998-2000 as evidenced by higher percent URI at all stations. During the fall sampling period, most stations needed improvement (39.1-76.7%) from the 1997-2003 data (Table 2), with the exception of the lower (2000-2001, 2003-2004) and middle stations (2000) that were approaching attainable community (79.6-120.1%) in the urban environment. The benthic community at all stations sampled during the fall was consistently rated lower than benthos collected during the spring sampling period according to the URI.

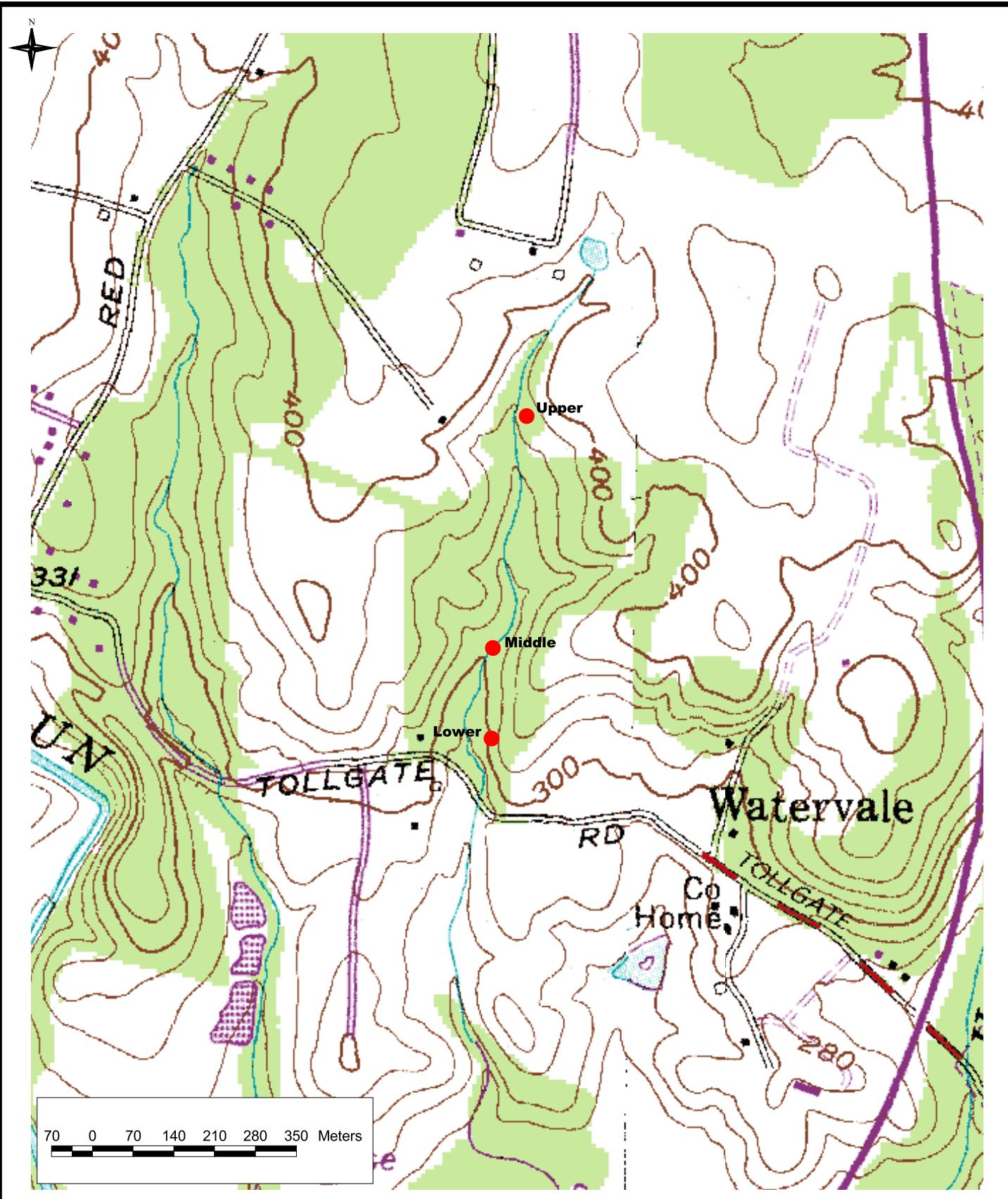
The HBI scores were calculated and rated according to the categories adopted by MBSS. The HBI scores for the lower (2.36 – 4.07), middle (2.07 – 4.48), and upper (1.39 – 4.02) stations were rated as good during the spring season for all years (Table 1). No temporal trends were evident according to the results of the regression analysis at each station (Figure 4). The HBI scores for the lower (2.43 – 3.14), middle (2.57 – 3.67), and upper (2.29 – 4.17) stations were rated as good during the fall season, with the exception of the lower station in 1998, which was rated as fair (5.01; Table 2).

The regression analysis for the fall season indicates decreasing scores or improving biological condition at the upper station ($R^2 = 0.78$) between the years 1997-2004 (Figure 5).

The Wilcoxon Signed-Rank test was used to investigate differences in HBI among the three stations in the same manner used to investigate differences in IBI scores (Table 3). The Wilcoxon Signed-Rank test is a nonparametric test for paired sample data that incorporates both the sign and magnitude of the difference between observations. The results of the Wilcoxon Signed-Rank test indicate that HBI scores are similar at all three stations (Table 3). The low HBI scores during the study period indicate that pollution does not appear to be a significant issue at the three stations according to the HBI. The low percentage of benthic taxa, which are relatively tolerant of high pollutant levels (ex. oligochaete worms), further support this conclusion.

REFERENCES

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- Stribling, J.B., B.K. Jessup, J.S. White, D. Boward, and M. Hurd. 1998. Development of a Benthic Index of Biotic Integrity for Maryland Streams. Prepared by Tetra Tech, Inc., Owings Mills, MD and Maryland Department of Natural Resources, Monitoring and Non-Tidal Assessment Program. CBWP-MANTA-EA-98-3.



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Hartford County
Benthic Monitoring
Harford County, Maryland

Figure 1.
Location of
Sampling Stations

17 December 2003

Figure 2. Regression Analysis Results of Index of Biotic Integrity (IBI) Scores at Ambient Monitoring Stations during Spring Sampling Event.

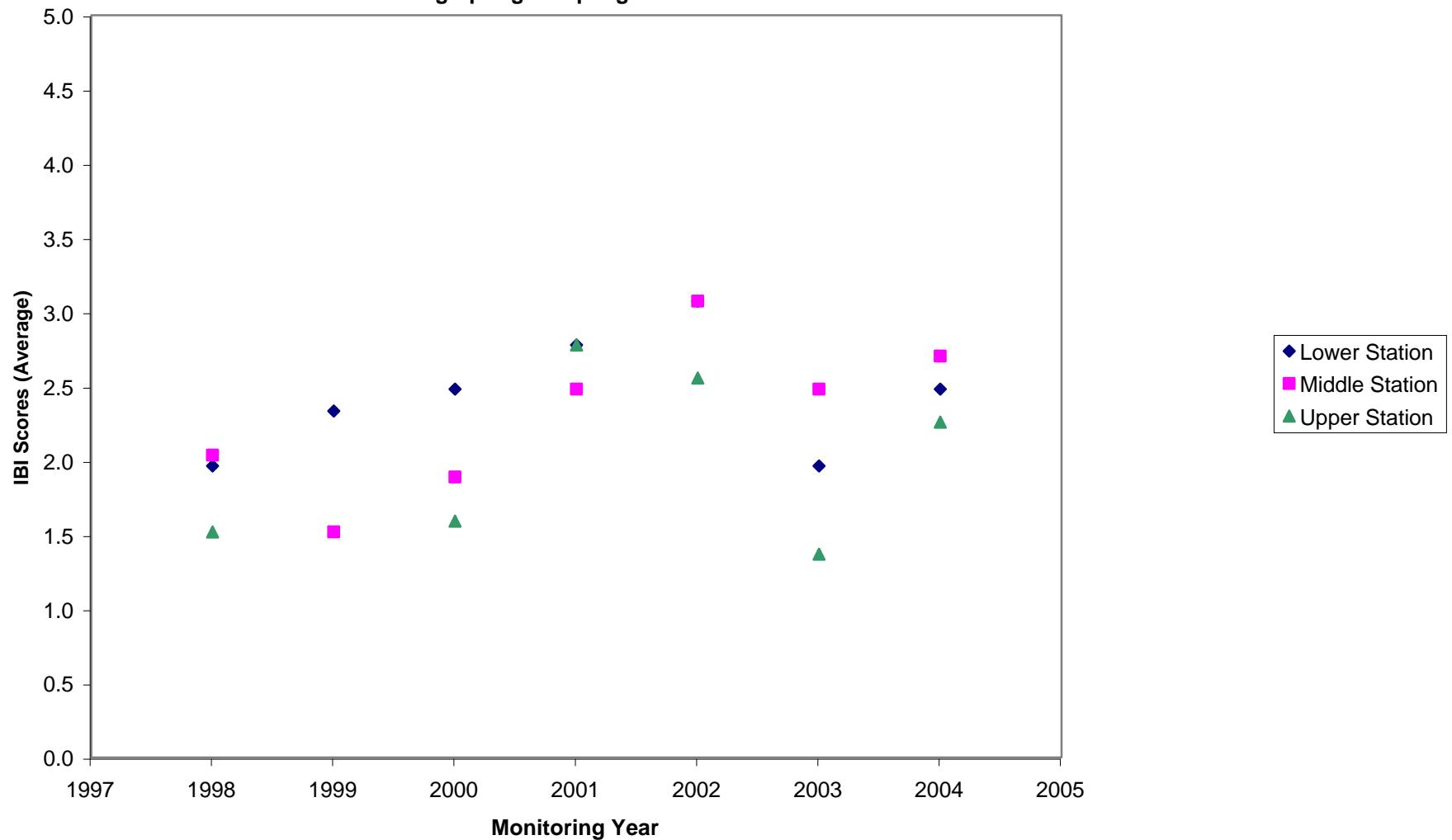


Figure 3. Regression Analysis Results of Index of Biotic Integrity (IBI) Scores at Ambient Monitoring Stations during Fall Sampling Event.

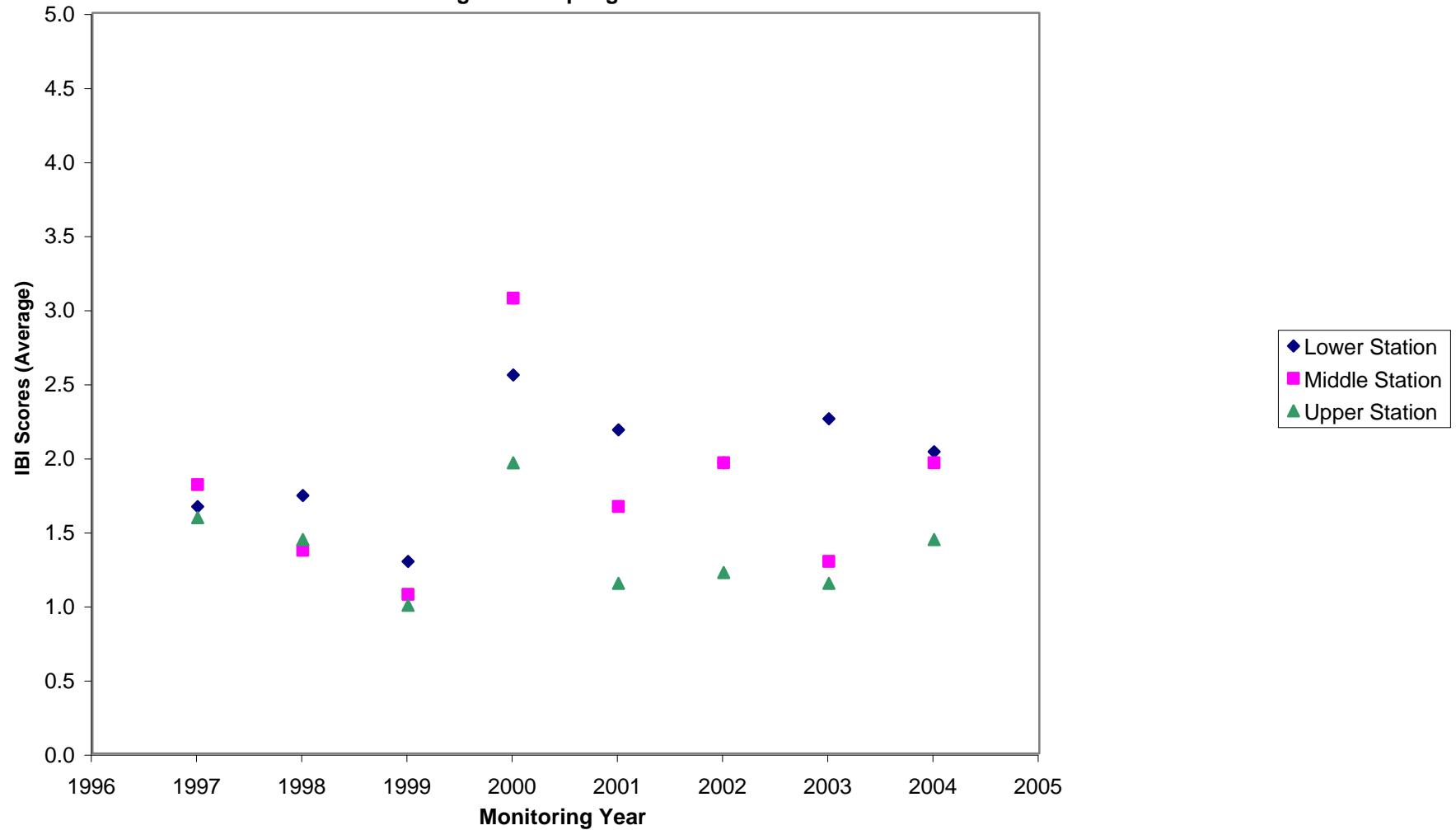


Figure 4. Regression Analysis Results of Hilsenhoff Biotic Index (HBI) at Ambient Monitoring Stations during Spring Sampling Event.

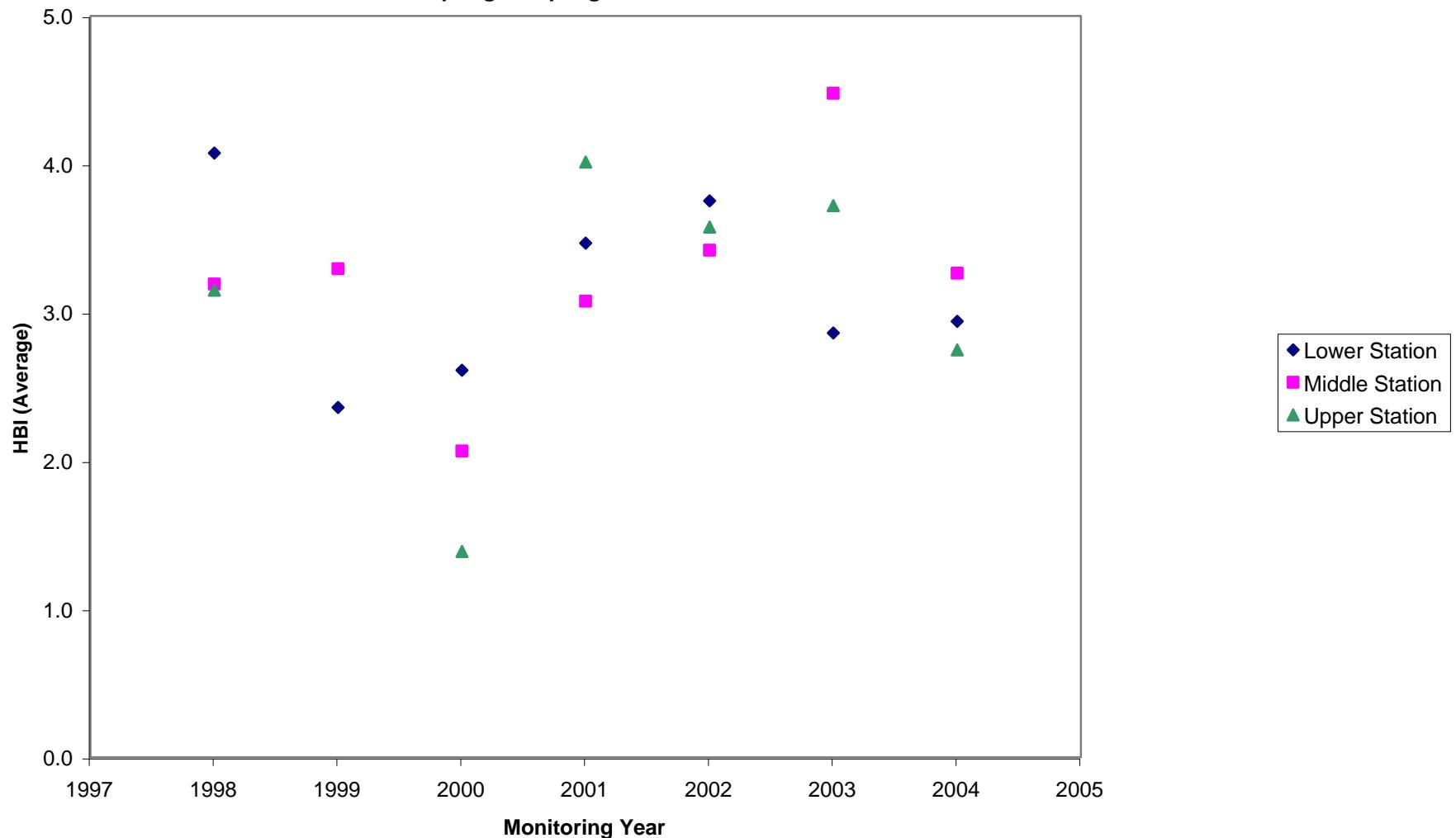


Figure 5. Regression Analysis Results of Hilsenhoff Biotic Index (HBI) at Ambient Monitoring Stations during Fall Sampling Event.

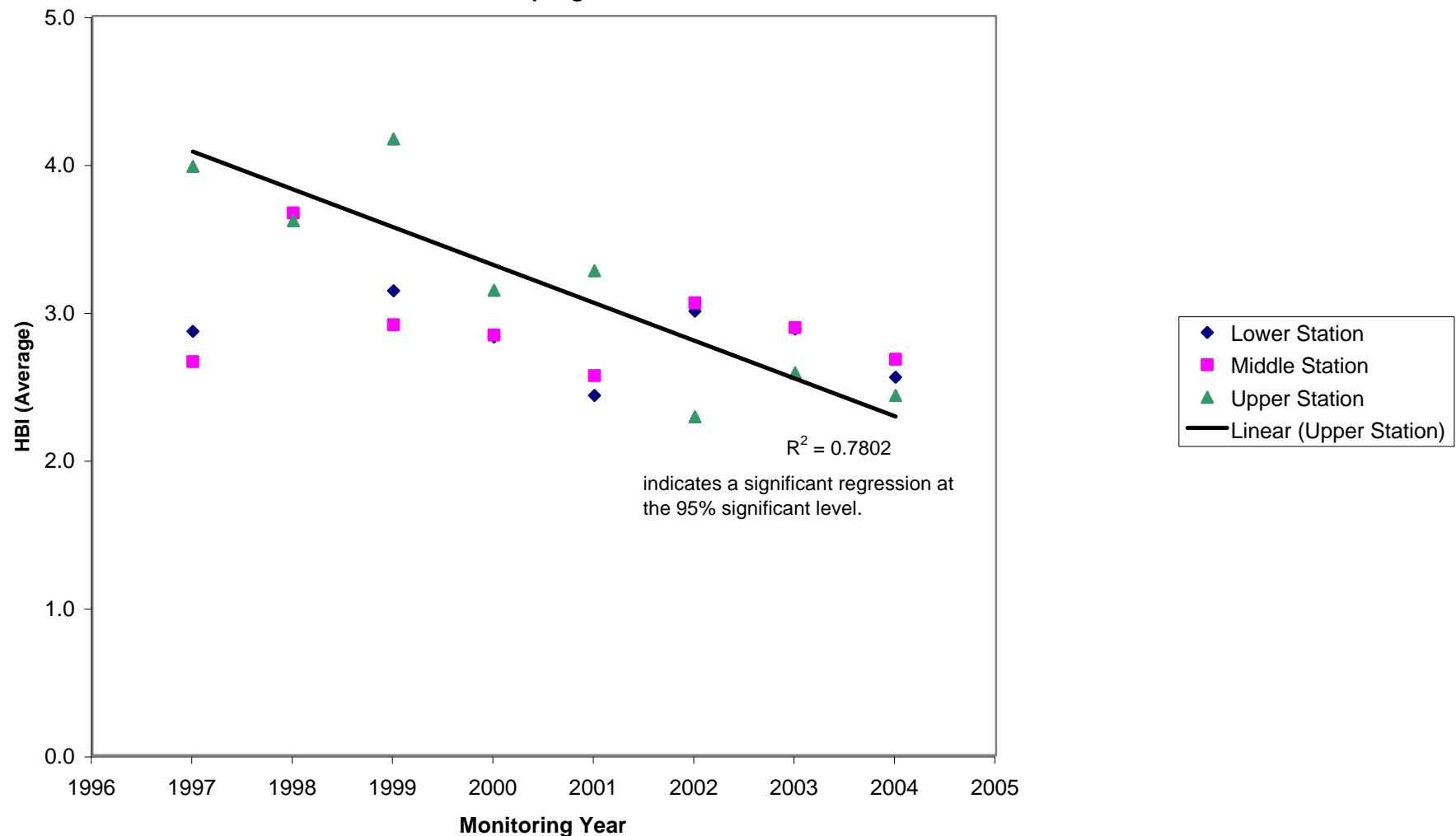


Table 1 Index of Biotic Integrity (IBI) Scores, Percent of Urban Reference Index (URI), Hilsenhoff Biotic Index (HBI), and Urban Narrative Rating for Spring Sampling Events

<u>Year</u>	<u>Station</u>	<u>IBI</u>	<u>Percent of URI</u>	<u>HBI</u>	<u>Urban Narrative Rating</u>
1998	lower	1.96	76.7	4.07	improvement needed
	middle	2.04	79.6	3.19	approaching attainable community
	upper	1.52	59.3	3.15	improvement needed
1999	lower	2.33	91.1	2.36	approaching attainable community
	middle	1.52	59.3	3.29	improvement needed
2000	lower	2.48	96.9	2.61	approaching attainable community
	middle	1.89	73.8	2.07	improvement needed
	upper	1.59	62.2	1.39	improvement needed
2001	lower	2.78	108.5	3.47	approaching attainable community
	middle	2.48	96.9	3.08	approaching attainable community
	upper	2.78	108.5	4.02	approaching attainable community
2002	lower	3.07	120.1	3.75	approaching attainable community
	middle	3.07	120.1	3.42	approaching attainable community
	upper	2.56	99.8	3.58	approaching attainable community
2003	lower	1.96	76.7	2.86	improvement needed
	middle	2.48	96.9	4.48	approaching attainable community
	upper	1.37	53.5	3.72	improvement needed
2004	lower	2.48	96.9	2.94	approaching attainable community
	middle	2.70	105.6	3.26	approaching attainable community
	upper	2.26	88.3	2.75	approaching attainable community

Table 2 Index of Biotic Integrity (IBI) Scores, Percent of Urban Reference Index (URI), Hilsenhoff Biotic Index (HBI), and Urban Narrative Rating for Fall Sampling Events

<u>Year</u>	<u>Station</u>	<u>IBI</u>	<u>Percent of URI</u>	<u>HBI</u>	<u>Urban Narrative Rating</u>
1997	lower	1.67	65.1	2.87	improvement needed
	middle	1.81	70.9	2.65	improvement needed
	upper	1.59	62.2	3.98	improvement needed
1998	lower	1.74	68.0	5.01	improvement needed
	middle	1.37	53.5	3.67	improvement needed
	upper	1.44	56.4	3.61	improvement needed
1999	lower	1.30	50.6	3.14	improvement needed
	middle	1.07	42.0	2.91	improvement needed
	upper	1.00	39.1	4.17	improvement needed
2000	lower	2.56	99.8	2.83	approaching attainable community
	middle	3.07	120.1	2.84	approaching attainable community
	upper	1.96	76.7	3.14	improvement needed
2001	lower	2.19	85.4	2.43	approaching attainable community
	middle	1.67	65.1	2.57	improvement needed
	upper	1.15	44.8	3.28	improvement needed
2002	lower	1.96	76.7	3.00	improvement needed
	middle	1.96	76.7	3.06	improvement needed
	upper	1.22	47.7	2.29	improvement needed
2003	lower	2.26	88.3	2.88	approaching attainable community
	middle	1.30	50.6	2.89	improvement needed
	upper	1.15	44.8	2.59	improvement needed
2004	lower	2.04	79.6	2.56	approaching attainable community
	middle	1.96	76.7	2.68	improvement needed
	upper	1.44	56.4	2.43	improvement needed

Table 3 Wilcoxon Signed-Rank Test Results of Mean IBI and HBI Scores
for the Lower, Middle, and Upper Sampling Locations.

Station	Mean IBI Score	
lower	2.19	a
middle	2.03	a
upper	1.66	b

Station	Mean HBI Score	
upper	3.12	a
lower	3.12	a
middle	3.07	a

Note: Mean scores with different letters are statistically different at the 95% significance level.

Appendix A. Phylogenetic list, tolerance values (TolVal), and functional feeding groups (FFG) of macroinvertebrates

order	family	taxon	TolVal [*]	FFG
Nematomorpha	Goriodea	Gordiodea		
Hoplonemertea	Prostomatidae	Prostoma sp.		Predator
Tricladida	Planariidae	Planariidae	1	Predator
Tricladida	Planariidae	Cura foremanii		
		Nematoda		
Tubificida	Enchytraeidae	Enchytraeidae	10	Collector
Lumbriculida	Lumbriculidae	Lumbriculidae	10	Collector
Tubificida	Naididae	Naididae	10	Collector
Tubificida	Naididae	Nais sp.		
Tubificida	Tubificidae	Tubificidae	10	Collector
Tubificida	Tubificidae	Spiroperma sp.	10	Collector
		Hirudinea		Predator
Gnathobdellida	Hirudinidae	Placobdella sp.		
		Gastropoda		
Limnephila	Physidae	Physella sp.	8	Scraper
Isopoda		Terrestrial/adults		
Isopoda		Terrestrial isopoda		
	Sphaeridae	Sphaeridae		Filterer
Decapoda	Cambaridae	Cambaridae	6	Shredder
Decapoda	Cambaridae	Cambarus sp.	6	Collector
Decapoda	Cambaridae	Orconectes sp.	6	Shredder
Collembola		Collembola		
Collembola	Isotomidae	Isotomurus sp.		
Ephemeroptera	Ameletidae	Ameletus sp.	0	Collector
Ephemeroptera	Baetidae	Baetidae		Collector
Ephemeroptera	Baetidae	Acentrella sp.		
Ephemeroptera	Baetidae	Baetis sp.	6	Collector
Ephemeroptera	Ephemerellidae	Ephemerellidae		
Ephemeroptera	Ephemerellidae	Eurylophella sp.	4	Scraper
Ephemeroptera	Heptageniidae	Heptageniidae		Scraper
Ephemeroptera	Heptageniidae	Epeorus sp.	0	Scraper
Ephemeroptera	Heptageniidae	Stenacron sp.	4	Collector
Ephemeroptera	Heptageniidae	Stenonema sp.	4	Scraper
Ephemeroptera	Leptophlebiidae	Leptophlebiidae		Collector
Ephemeroptera	Leptophlebiidae	Paraleptophlebia sp.	2	Collector
Odonata		Odonata		Predator
Odonata	Aeshnidae	Boyeria sp.	2	Predator
Odonata	Calopterygidae	Calopteryx sp.	6	Predator
Odonata	Cordulegastridae	Cordulegaster sp.	3	Predator
Odonata	Gomphidae	Gomphidae		Predator
Odonata	Gomphidae	Lanthus sp.	6	Predator
Odonata	Gomphidae	Stylogomphus sp.		Predator
Plecoptera		Plecoptera		
Plecoptera	Capniidae	Capniidae		Shredder
Plecoptera	Capniidae	Allocapnia sp.	3	Shredder
Plecoptera	Leuctridae	Leuctridae		Shredder
Plecoptera	Leuctridae	Leuctra sp.	0	Shredder
Plecoptera	Nemouridae	Nemouridae		Shredder
Plecoptera	Nemouridae	Amphinemura sp.	3	Shredder
Plecoptera	Perlidae	Perlidae		Predator
Plecoptera	Perlidae	Acroneuria sp.	0	Predator
Plecoptera	Perlidae	Acroneuria abnormis		

Appendix A. Phylogenetic list, tolerance values (TolVal), and functional feeding groups (FFG) of macroinvertebrates

order	family	taxon	TolVal [*]	FFG
Plecoptera	Perlidae	<i>Eccoptura</i> sp.		Predator
Plecoptera	Perlidae	<i>Perlesta</i> sp.	4	Predator
Plecoptera	Perlodidae	Perlodidae		Predator
Plecoptera	Taeniopterygidae	<i>Taeniopteryx</i> sp.	2	Shredder
Hemiptera	Vellidae	<i>Microvelia</i> sp.	6	Predator
Hemiptera	Vellidae	<i>Rhagovelia</i> sp.		
Hemiptera	Gerridae	<i>Trepobates</i> sp.		Predator
Megaloptera	Corydalidae	Corydalidae		
Megaloptera	Corydalidae	<i>Nigronia</i> sp.	0	Predator
Megaloptera	Sialidae	<i>Sialis</i> sp.	4	Predator
Trichoptera	Glossosomatidae	<i>Glossosoma</i> sp.	0	Scraper
Trichoptera	Glossosomatidae	<i>Glossosoma nigrior</i>		
Trichoptera	Hydropsychidae	Hydropsychidae		Filterer
Trichoptera	Hydropsychidae	<i>Cheumatopsyche</i> sp.	5	Filterer
Trichoptera	Hydropsychidae	<i>Diplectrona</i> sp.	2	Filterer
Trichoptera	Hydropsychidae	<i>Diplectrona modesta</i>		
Trichoptera	Hydropsychidae	<i>Hydropsyche</i> sp.	6	Filterer
Trichoptera	Hydropsychidae	<i>Hydropsyche betteni</i>		
Trichoptera	Lepidostomatidae	<i>Lepidostoma</i> sp.	3	Shredder
Trichoptera	Leptoceridae	Leptoceridae	4	Collector
Trichoptera	Limnephilidae	Limnephilidae		Shredder
Trichoptera	Limnephilidae	<i>Hydatophylax</i> sp.	2	Shredder
Trichoptera	Odontoceridae	<i>Psilotreta</i> sp.	0	Scraper
Trichoptera	Philopotamidae	Philopotamidae		Filterer
Trichoptera	Philopotamidae	<i>Chimarra</i> sp.	4	Filterer
Trichoptera	Philopotamidae	<i>Chimarra aterrima</i>		
Trichoptera	Philopotamidae	<i>Dolophilodes</i> sp.	0	Filterer
Trichoptera	Philopotamidae	<i>Dolophilodes distinctus</i>		
Trichoptera	Polycentropodidae	<i>Neureclipsis</i> sp.	7	Filterer
Trichoptera	Polycentropodidae	<i>Polycentropus</i> sp.	5	Filterer
Trichoptera	Psychomyiidae	<i>Lype</i> sp.	2	Scraper
Trichoptera	Rhyacophilidae	Rhyacophilidae		
Trichoptera	Rhyacophilidae	<i>Rhyacophila</i> sp.	1	Predator
Trichoptera	Uenooidae	<i>Neophylax</i> sp.	3	Scraper
Coleoptera	Curculionidae	Curculionidae		
Coleoptera	Drypidae	<i>Helichus</i> sp.	5	Scraper
Coleoptera	Dytiscidae	<i>Deronectes</i> sp.	5	Predator
Coleoptera	Dytiscidae	<i>Hydroporus</i> sp.	5	Predator
Coleoptera	Elmidae	Elmidae	5	Collector
Coleoptera	Elmidae	<i>Microcylleopus</i> sp.		
Coleoptera	Elmidae	<i>Optioservus</i> sp.	4	Scraper
Coleoptera	Elmidae	<i>Oulimnius</i> sp.	2	Scraper
Coleoptera	Elmidae	<i>Promoresia</i> sp.	2	Scraper
Coleoptera	Elmidae	<i>Stenelmis</i> sp.	6	Scraper
Coleoptera	Hydrophilidae	<i>Hydrobius</i> sp.	5	Collector
Coleoptera	Hydrophilidae	<i>Tropisternus</i> sp.	10	Collector
Coleoptera	Psephenidae	<i>Psephenus</i> sp.	4	Scraper
Coleoptera	Psephenidae	<i>Psephenus herricki</i>		
Coleoptera	Psephenidae	<i>Ectopria</i> sp.	5	Scraper
Coleoptera	Psephenidae	<i>Ectopria nervosa</i>		
Coleoptera	Ptilodactylidae	<i>Anchytaurus</i> sp.	4	Shredder
Coleoptera	Ptilodactylidae	<i>Anchytaurus bicolor</i>		

Appendix A. Phylogenetic list, tolerance values (TolVal), and functional feeding groups (FFG) of macroinvertebrates

order	family	taxon	TolVal [*]	FFG
Diptera		Diptera		
Diptera	Ceratopogonidae	Ceratopogonidae		Predator
Diptera	Ceratopogonidae	Probezzia sp.	6	Predator
Diptera	Chironomidae	Chironomidae		
Diptera	Chironomidae	Chironomini	6	
Diptera	Chironomidae	Tanytarsini		
Diptera	Chironomidae	Tanypodinae		
Diptera	Chironomidae	Orthocladiinae		
Diptera	Chironomidae	Brillia sp.	5	Shredder
Diptera	Chironomidae	Orthocladius sp.	6	Collector
Diptera	Chironomidae	Paraphaenocladius sp.	4	Collector
Diptera	Chironomidae	Chaetocladius sp.	6	Collector
Diptera	Chironomidae	Conchapelopia sp.	6	Predator
Diptera	Chironomidae	Corynoneura sp.	7	Collector
Diptera	Chironomidae	Cricotopus/orthocladius gr.		Shredder
Diptera	Chironomidae	Cricotopus sp.	7	Shredder
Diptera	Chironomidae	Cricotopus/orthocladius sp.		Shredder
Diptera	Chironomidae	Diamesinae		
Diptera	Chironomidae	Diamesa sp.	5	Collector
Diptera	Chironomidae	Diplocladius sp.	7	Collector
Diptera	Chironomidae	Eukiefferiella sp.	8	Collector
Diptera	Chironomidae	Heterotriaccoelius sp.		Collector
Diptera	Chironomidae	Hydrobaenus sp.	8	Scraper
Diptera	Chironomidae	Limnophyes sp.		Collector
Diptera	Chironomidae	Micropsectra sp.	7	Collector
Diptera	Chironomidae	Microtendipes sp.	6	Filterer
Diptera	Chironomidae	Orthocladiinae		
Diptera	Chironomidae	Nilotanytarsus sp.	6	Predator
Diptera	Chironomidae	Parachaetocladius sp.	2	Collector
Diptera	Chironomidae	Parakiefferiella sp.	4	Collector
Diptera	Chironomidae	Paramerina sp.	4	Predator
Diptera	Chironomidae	Parametriocnemus sp.	5	Collector
Diptera	Chironomidae	Phaenopsectra sp.	7	Collector
Diptera	Chironomidae	Polydellium sp.	6	Shredder
Diptera	Chironomidae	Pseudoorthocladius sp.	0	Collector
Diptera	Chironomidae	Rheotanytarsus sp.	6	Filterer
Diptera	Chironomidae	Stempellinella sp.	4	Collector
Diptera	Chironomidae	Stempellina sp.		
Diptera	Chironomidae	Stilocladius sp.		
Diptera	Chironomidae	Tanytarsus sp.	6	Filterer
Diptera	Chironomidae	Thienemannimyia sp.		Predator
Diptera	Chironomidae	Thienemannimyia grp.		Predator
Diptera	Chironomidae	Trissopelopia sp.		Predator
Diptera	Chironomidae	Tvetenia sp.	5	Collector
Diptera	Chironomidae	Thienemannimyia sp.	6	Collector
Diptera	Chironomidae	Zavrelimyia sp.	8	Predator
Diptera	Chironominae	Chironominae		
Diptera	Empididae	Empididae		Predator
Diptera	Empididae	Clinocera sp.		Predator
Diptera	Empididae	Chelifera sp.		Predator
Diptera	Empididae	Hemerodromia sp.	6	Predator
Diptera	Simuliidae	Simuliidae	7	Filterer
Diptera	Simuliidae	Prosimulium sp.	7	Filterer

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order	family	taxon	TolVal [*]	FFG
Diptera	Simuliidae	<i>Simulium</i> sp.	7	Filterer
Diptera	Tabanidae	<i>Tabanidae</i>	8	Predator
Diptera	Tabanidae	<i>Chrysops</i> sp.	7	Predator
Diptera	Tipulidae	<i>Tipulidae</i>		Predator
Diptera	Tipulidae	<i>Antocha</i> sp.	5	Collector
Diptera	Tipulidae	<i>Dicranota</i> sp.	4	Predator
Diptera	Tipulidae	<i>Hexatoma</i> sp.	4	Predator
Diptera	Tipulidae	<i>Pseudolimnophila</i> sp.	2	Predator
Diptera	Tipulidae	<i>Tipula</i> sp.	4	Shredder

*Tolerance values indicate the sensitivity of benthic macroinvertebrates to stressors
stressors and have been incorporated into various indices as a way to determine
stream conditions.

Appendix B-1. 1997 taxon list and counts

order	family	tribe	taxon name	Fall 1997								
				lower			middle			upper		
				1	2	3	1	2	3	1	2	3
Gasteropoda	Planariidae		Curaforemanii				1			3		1
	Lumbriculidae		Lumbriculidae			1						
	Tubificidae		Tubificidae									
Ephemeroptera	Baetidae		Baetidae			3		4				
Ephemeroptera	Ephemerellidae		Eurylophella sp.				2					
Ephemeroptera	Heptageniidae		Epeorus sp.			1	3					
Ephemeroptera	Leptophlebiidae		Paraleptophlebia sp.	1		4	1	2				2
Odonata	Cordulegastridae		Cordulegaster sp.				1					
Plecoptera	Capniidae		Allocapnia sp.	3		3	2	1	5			
Plecoptera	Leuctridae		Leuctra sp.			1					1	
Plecoptera	Perlidae		Acroneuria abnormis									
Plecoptera	Perlidae		Eccoptura sp.									
Plecoptera	Taeniopterygidae		Taeniopteryx sp.	7	27	9	5	25	19	3	1	9
Megaloptera	Corydalidae		Nigronia sp.	1	1				1			
Megaloptera	Sialidae		Sialis sp.			1				2		
Trichoptera	Glossosomatidae		Glossosoma nigrior		1	1						
Trichoptera	Hydropsychidae		Cheumatopsyche sp.		2	16						
Trichoptera	Hydropsychidae		Diplectrona modesta	1	13	6						
Trichoptera	Hydropsychidae		Hydropsyche sp.		1							
Trichoptera	Limnephilidae		Limnephilidae		1							
Trichoptera	Philopotamidae		Chimarra aterrima				1					
Trichoptera	Philopotamidae		Dolophilodes distinctus		2		1					
Trichoptera	Rhyacophilidae		Rhyacophila sp.					1				1
Coleoptera	Elmidae		Optioservus sp.		1	1		2				
Coleoptera	Elmidae		Oulimnius sp.			10		1			1	
Coleoptera	Hydrophilidae		Stenelmis sp.	1	2						1	1
Coleoptera	Psephenidae		Psephenus herricki	3		9		10	4			
Coleoptera	Psephenidae		Ectopria nervosa	1	1		1	1		4		4
Coleoptera	Ptilodactylidae		Anchyrtarsus sp.			1						
Diptera	Chironomidae		Tanypodinae			1			1			
Diptera	Chironomidae		Orthocladiinae		7	4			3			
Diptera	Chironomidae	Pentaneurini	Conchapelopia sp.								1	
Diptera	Chironomidae		Diplocladius sp.								1	1

Appendix B-1. 1997 taxon list and counts

order	family	tribe	taxon name	Fall 1997								
				lower			middle			upper		
1	2	3	1	2	3	1	2	3	1	2	3	
Diptera	Chironomidae		Parachaetocladius sp.	1								
Diptera	Chironomidae		Trissopelopia sp.	2	2	1			2			1
Diptera	Tipulidae		Dicranota sp.									

Appendix B-2. 1998 taxon list and counts

order	family	tribe	taxon name	Spring 1998								
				lower			middle			upper		
				1	2	3	1	2	3	1	2	3
Hoploneurtea	Prostomatidae		Prostoma sp.									
	Lumbriculidae		Lumbriculidae									1
Decapoda	Cambaridae		Cambaridae					1				
Decapoda	Cambaridae		Cambarus sp.									1
Ephemeroptera	Baetidae		Baetidae					2				1
Ephemeroptera	Baetidae		Baetis sp.	15		1						
Ephemeroptera	Leptophlebiidae		Paraleptophlebia sp.	3	1			1				1
Odonata	Gomphidae		Gomphidae	3		2						
Odonata	Gomphidae		Lanthus sp.									1
Plecoptera	Capniidae		Capniidae									
Plecoptera	Capniidae		Allocapnia sp.									
Plecoptera	Leuctridae		Leuctra sp.	53		1	7	26	2			
Plecoptera	Nemouridae		Amphinemura sp.		9		2					
Plecoptera	Perlidae		Perlidae		1		1	2	1			
Plecoptera	Perlidae		Acroneuria abnormis	1	1							
Plecoptera	Perlodidae		Perlodidae									
Plecoptera	Taeniopterygidae		Taeniopteryx sp.									
Hemiptera	Vellidae		Microvelia sp.									
Hemiptera	Vellidae		Rhagovelia sp.	1						2	1	
Hemiptera	Gerridae		Trepobates sp.	1								
Megaloptera	Corydalidae		Nigronia sp.	1		1						
Megaloptera	Sialidae		Sialis sp.									2
Trichoptera	Glossosomatidae		Glossosoma nigrior	1	3		1	1	2			
Trichoptera	Hydropsychidae		Cheumatopsyche sp.	21	3	4	2	11	1	3	4	21
Trichoptera	Hydropsychidae		Diplectrona modesta	16	5	7	7	28	4	4	4	12
Trichoptera	Hydropsychidae		Hydropsyche sp.	6	4			24	1			
Trichoptera	Hydropsychidae		Hydropsyche betteni									
Trichoptera	Lepidostomatidae		Lepidostoma sp.					2				
Trichoptera	Odontoceridae		Psilotreta sp.					1				
Trichoptera	Philopotamidae		Chimarra aterrima	2	1	3		1				
Trichoptera	Philopotamidae		Dolophilodes distinctus	11				6				1
Trichoptera	Polycentropodidae		Polycentropus sp.	1	1		1					
Trichoptera	Rhyacophilidae		Rhyacophila sp.									

Appendix B-2. 1998 taxon list and counts

order	family	tribe	taxon name	Spring 1998								
				lower			middle			upper		
				1	2	3	1	2	3	1	2	3
Trichoptera	Uenoidae		<i>Neophylax</i> sp.						1			
Coleoptera	Dryopidae		<i>Helichus</i> sp.					1				
Coleoptera	Dytiscidae		<i>Derонектес</i> sp.					1				
Coleoptera	Elmidae		<i>Optioservus</i> sp.									
Coleoptera	Elmidae		<i>Oulimnius</i> sp.	3				3				
Coleoptera	Hydrophilidae		<i>Hydrobius</i> sp.									
Coleoptera	Hydrophilidae		<i>Stenelmis</i> sp.	1	3		10	1				3
Coleoptera	Psephenidae		<i>Psephenus herricki</i>	14	8	13	2	12	2	6	2	13
Coleoptera	Psephenidae		<i>Ectopria nervosa</i>	1			3	5		6	7	13
Coleoptera	Ptilodactylidae		<i>Anchyrtarsus bicolor</i>	1	1							
Diptera	Chironomidae		<i>Brillia</i> sp.					1				
Diptera	Chironomidae	Pentaneurini	<i>Conchapelopia</i> sp.	7	1			2	1			1
Diptera	Chironomidae		<i>Corynoneura</i> sp.									3
Diptera	Chironomidae		<i>Cricotopus/Orthocladius</i> sp.									
Diptera	Chironomidae		<i>Eukiefferiella</i> sp.									
Diptera	Chironomidae	Tanytarsini	<i>Micropsectra</i> sp.					6				
Diptera	Chironomidae		<i>Parachaetocladius</i> sp.									
Diptera	Chironomidae		<i>Parakiefferiella</i> sp.									
Diptera	Chironomidae		<i>Parametriocnemus</i> sp.					14				
Diptera	Chironomidae	Chironomini	<i>Polypedilum</i> sp.	1				2				
Diptera	Chironomidae	Tanytarsini	<i>Rheotanytarsus</i> sp.					2				
Diptera	Chironomidae		<i>Trissopelopia</i> sp.	3				5				
Diptera	Chironomidae		<i>Tvetenia</i> sp.		1			12	1			
Diptera	Empididae		<i>Hemerodromia</i> sp.									
Diptera	Simuliidae		<i>Simulium</i> sp.	1				8				
Diptera	Tipulidae		<i>Antocha</i> sp.	2			1	1				
Diptera	Tipulidae		<i>Tipula</i> sp.								2	

Appendix B-2. 1998 taxon list and counts

order	family	tribe	taxon name	Fall 1998								
				lower			middle			upper		
				1	2	3	1	2	3	1	2	3
Hoplonemertea	Prostomatidae		Prostoma sp.	1								
	Lumbriculidae		Lumbriculidae									
Decapoda	Cambaridae		Cambaridae									
Decapoda	Cambaridae		Cambarus sp.									
Ephemeroptera	Baetidae		Baetidae									
Ephemeroptera	Baetidae		Baetis sp.				2					
Ephemeroptera	Leptophlebiidae		Paraleptophlebia sp.							3		1
Odonata	Gomphidae		Gomphidae							1		1
Odonata	Gomphidae		Lanthus sp.									
Plecoptera	Capniidae		Capniidae	1	1							
Plecoptera	Capniidae		Allocapnia sp.				42	2	2	4		
Plecoptera	Leuctridae		Leuctra sp.									1
Plecoptera	Nemouridae		Amphinemura sp.									
Plecoptera	Perlidae		Perlidae									
Plecoptera	Perlidae		Acroneuria abnormis									
Plecoptera	Perlodidae		Perlodidae				1					
Plecoptera	Taeniopterygidae		Taeniopteryx sp.	1		5		2	1	4	3	
Hemiptera	Vellidae		Microvelia sp.									
Hemiptera	Vellidae		Rhagovelia sp.									
Hemiptera	Gerridae		Trepobates sp.									
Megaloptera	Corydalidae		Nigronia sp.								1	
Megaloptera	Sialidae		Sialis sp.									
Trichoptera	Glossosomatidae		Glossosoma nigrior									
Trichoptera	Hydropsychidae		Cheumatopsyche sp.	1			1					
Trichoptera	Hydropsychidae		Diplectrona modesta	1	4	6	2					
Trichoptera	Hydropsychidae		Hydropsyche sp.				2					
Trichoptera	Hydropsychidae		Hydropsyche betteni				3					
Trichoptera	Lepidostomatidae		Lepidostoma sp.	2								
Trichoptera	Odontoceridae		Psilotreta sp.									
Trichoptera	Philopotamidae		Chimarra aterrima									
Trichoptera	Philopotamidae		Dolophilodes distinctus									
Trichoptera	Polycentropodidae		Polycentropus sp.									1
Trichoptera	Rhyacophilidae		Rhyacophila sp.									1

Appendix B-2. 1998 taxon list and counts

order	family	tribe	taxon name	Fall 1998								
				lower			middle			upper		
				1	2	3	1	2	3	1	2	3
Trichoptera	Uenoidae		<i>Neophylax</i> sp.									1
Coleoptera	Dryopidae		<i>Helichus</i> sp.									1
Coleoptera	Dytiscidae		<i>Derонектес</i> sp.									
Coleoptera	Elmidae		<i>Optioservus</i> sp.							1	1	11
Coleoptera	Elmidae		<i>Oulimnius</i> sp.							1		
Coleoptera	Hydrophilidae		<i>Hydrobius</i> sp.									
Coleoptera	Hydrophilidae		<i>Stenelmis</i> sp.				1	1	1		2	1
Coleoptera	Psephenidae		<i>Psephenus herricki</i>	3	1		2	1	1	1	3	7
Coleoptera	Psephenidae		<i>Ectopria nervosa</i>	1		1					8	3
Coleoptera	Ptilodactylidae		<i>Anchyrtarsus bicolor</i>									
Diptera	Chironomidae		<i>Brillia</i> sp.									
Diptera	Chironomidae	Pentaneurini	<i>Conchapelopia</i> sp.	1								
Diptera	Chironomidae		<i>Corynoneura</i> sp.	1								
Diptera	Chironomidae	Tanytarsini	<i>Cricotopus/Orthocladius</i> sp.	1								
Diptera	Chironomidae		<i>Eukiefferiella</i> sp.	4	1	10		1		1		
Diptera	Chironomidae	Tanytarsini	<i>Micropsectra</i> sp.		1							
Diptera	Chironomidae		<i>Parachaetocladius</i> sp.							1		
Diptera	Chironomidae	Chironomini	<i>Parakiefferiella</i> sp.				1					
Diptera	Chironomidae		<i>Parametriocnemus</i> sp.									
Diptera	Chironomidae	Tanytarsini	<i>Polypedilum</i> sp.				1					
Diptera	Chironomidae		<i>Rheotanytarsus</i> sp.							1		
Diptera	Chironomidae		<i>Trissopelopia</i> sp.									
Diptera	Chironomidae		<i>Tvetenia</i> sp.				2					
Diptera	Empididae		<i>Hemerodromia</i> sp.	1								
Diptera	Simuliidae		<i>Simulium</i> sp.									
Diptera	Tipulidae		<i>Antocha</i> sp.									
Diptera	Tipulidae		<i>Tipula</i> sp.	1	6	4	1					6

Appendix B-3. 1999 taxon list and counts

order	family	tribe	taxon name	Spring 1999					
				lower			middle		
				1	2	3	1	2	3
Isopoda	Lumbriculidae		Lumbriculidae	1		2	1		
Isopoda			Terrestrial/Adults		3		1	1	
			Terrestrial Isopoda						
Decapoda	Cambaridae		Cambaridae			1			
Decapoda	Cambaridae		Orconectes sp.		1				
Ephemeroptera	Baetidae		Baetidae		1	9	3	1	
Ephemeroptera	Leptophlebiidae		Leptophlebiidae		1				
Odonata			Odonata			1			
Odonata	Gomphidae		Gomphidae				2		
Plecoptera	Leuctridae		Leuctridae						
Plecoptera	Leuctridae		Leuctra sp.	6	3	13	10	10	
Plecoptera	Nemouridae		Amphinemura sp.			1			
Plecoptera	Perlidae		Perlidae	12	7	9	3		
Plecoptera	Perlidae		Acroneuria sp.						
Hemiptera	Vellidae		Microvelia sp.			1	1	1	
Trichoptera	Glossosomatidae		Glossosoma sp.	1	4	7	1		
Trichoptera	Hydropsychidae		Hydropsychidae	13		12			
Trichoptera	Hydropsychidae		Cheumatopsyche sp.	3		2		1	1
Trichoptera	Hydropsychidae		Diplectrona sp.	11	11	38	5	18	
Trichoptera	Hydropsychidae		Hydropsyche sp.	14		7	1		
Trichoptera	Leptoceridae		Leptoceridae						
Trichoptera	Philopotamidae		Philopotamidae			3			
Trichoptera	Philopotamidae		Chimarra sp.			5	4	8	
Trichoptera	Philopotamidae		Dolophilodes sp.	14	12	5			
Trichoptera	Psychomyiidae		Lype sp.	1					
Trichoptera	Rhyacophilidae		Rhyacophilidae					1	
Trichoptera	Uenoidae		Neophylax sp.				1		
Coleoptera	Dytiscidae		Hydroporus sp.			2			
Coleoptera	Elmidae		Elmidae						
Coleoptera	Elmidae		Promoresia sp.	1					
Coleoptera	Hydrophilidae		Stenelmis sp.	2				1	

Appendix B-3. 1999 taxon list and counts

order	family	tribe	taxon name	Spring 1999					
				lower			middle		
				1	2	3	1	2	3
Coleoptera	Psephenidae		<i>Psephenus</i> sp.	2			19	3	13
Coleoptera	Psephenidae		<i>Ectopria</i> sp.				9	3	
Diptera	Chironomidae	Tanytarsini	Tanytarsini	1				1	
Diptera	Chironomidae		Tanypodinae						
Diptera	Chironomidae		Orthocladiinae						
Diptera	Chironomidae		<i>Conchapelopia</i> sp.	4	1	2			
Diptera	Chironomidae		<i>Cricotopus/Orthocladius</i> gr.						
Diptera	Chironomidae		<i>Parametriocnemus</i> sp.	6		2			
Diptera	Chironomidae	Tanytarsini	<i>Rheotanytarsus</i> sp.				1		
Diptera	Chironomidae	Tanytarsini	<i>Tanytarsus</i> sp.				5	1	
Diptera	Chironomidae		<i>Trissopelopia</i> sp.				3		
Diptera	Chironomidae		<i>Tvetenia</i> sp.						
Diptera	Simuliidae		<i>Simulium</i> sp.	2		2			
Diptera	Tipulidae		<i>Tipula</i> sp.	1		2			

Appendix B-3. 1999 taxon list and counts

order	family	tribe	taxon name	Fall 1999							
				lower			middle			upper	
				1	2	3	1	2	3	1	2
Isopoda	Lumbriculidae		Lumbriculidae							1	1
Isopoda			Terrestrial/Adults								
			Terrestrial Isopoda		1						
Decapoda	Cambaridae		Cambaridae								
Decapoda	Cambaridae		Orconectes sp.								
Ephemeroptera	Baetidae		Baetidae								
Ephemeroptera	Leptophlebiidae		Leptophlebiidae								
Odonata			Odonata								
Odonata	Gomphidae		Gomphidae								
Plecoptera	Leuctridae		Leuctridae								
Plecoptera	Leuctridae		Leuctra sp.								
Plecoptera	Nemouridae		Amphinemura sp.								
Plecoptera	Perlidae		Perlidae							2	
Plecoptera	Perlidae		Acroneuria sp.	1		1					
Hemiptera	Vellidae		Microvelia sp.								
Trichoptera	Glossosomatidae		Glossosoma sp.								
Trichoptera	Hydropsychidae		Hydropsychidae								
Trichoptera	Hydropsychidae		Cheumatopsyche sp.								
Trichoptera	Hydropsychidae		Diplectrona sp.	13	3	1					
Trichoptera	Hydropsychidae		Hydropsyche sp.		1						
Trichoptera	Leptoceridae		Leptoceridae								
Trichoptera	Philopotamidae		Philopotamidae								
Trichoptera	Philopotamidae		Chimarra sp.		1						
Trichoptera	Philopotamidae		Dolophilodes sp.	1	2						
Trichoptera	Psychomyiidae		Lype sp.								
Trichoptera	Rhyacophilidae		Rhyacophilidae								
Trichoptera	Uenoidae		Neophylax sp.								
Coleoptera	Dytiscidae		Hydroporus sp.								
Coleoptera	Elmidae		Elmidae	1							
Coleoptera	Elmidae		Promoresia sp.								
Coleoptera	Hydrophilidae		Stenelmis sp.								

Appendix B-3. 1999 taxon list and counts

order	family	tribe	taxon name	Fall 1999							
				lower			middle			upper	
				1	2	3	1	2	3	1	2
Coleoptera	Psephenidae		Psephenus sp.	3	2	1	1		3		
Coleoptera	Psephenidae		Ectopria sp.								1
Diptera	Chironomidae	Tanytarsini	Tanytarsini								
Diptera	Chironomidae		Tanypodinae				1				
Diptera	Chironomidae		Orthocladiinae								
Diptera	Chironomidae		Conchapelopia sp.								
Diptera	Chironomidae		Cricotopus/Orthocladius gr.	1							
Diptera	Chironomidae		Parametriocnemus sp.								
Diptera	Chironomidae	Tanytarsini	Rheotanytarsus sp.								
Diptera	Chironomidae	Tanytarsini	Tanytarsus sp.	1							
Diptera	Chironomidae		Trissopelopia sp.								
Diptera	Chironomidae		Tvetenia sp.								
Diptera	Simuliidae		Simulium sp.								
Diptera	Tipulidae		Tipula sp.	1	1	1			1		

Appendix B-4. 2000 taxon list and counts

order	family	tribe	taxon name	Spring 2000								
				lower			middle			upper		
				1	2	3	1	2	3	1	2	3
Decapoda	Lumbriculidae		Nematoda	1								
	Cambaridae		Lumbriculidae	1					1			
Collembola			Collembola									
Ephemeroptera	Ameletidae		Ameletus sp.									
Ephemeroptera	Baetidae		Baetidae	5			5	2			1	
Ephemeroptera	Ephemerellidae		Ephemerellidae									
Ephemeroptera	Ephemerellidae		Eurylophella sp.									
Ephemeroptera	Heptageniidae		Heptageniidae									
Ephemeroptera	Heptageniidae		Epeorus sp.									
Ephemeroptera	Heptageniidae		Stenacron sp.									
Ephemeroptera	Leptophlebiidae		Leptophlebiidae	2		9						
Ephemeroptera	Leptophlebiidae		Paraleptophlebia sp.									
Odonata	Calopterygidae		Calopteryx sp.									
Odonata	Gomphidae		Gomphidae		4	1						
Plecoptera	Capniidae		Plecoptera							3	1	
Plecoptera	Capniidae		Capniidae									
Plecoptera	Capniidae		Allocapnia sp.									
Plecoptera	Leuctridae		Leuctra sp.	23	13	11	25	26	16	101	15	10
Plecoptera	Nemouridae		Amphinemura sp.			1						
Plecoptera	Perlidae		Perlidae	17	6	2	1					
Plecoptera	Perlidae		Acroneuria sp.	2								
Plecoptera	Perlidae		Eccoptura sp.	1			2					
Plecoptera	Taeniopterygidae		Taeniopteryx sp.									
Megaloptera	Corydalidae		Corydalidae	1								
Megaloptera	Corydalidae		Nigronia sp.				2					
Megaloptera	Sialidae		Sialis sp.									
Trichoptera	Glossosomatidae		Glossosoma sp.	4	2	5			2			
Trichoptera	Hydropsychidae		Hydropsychidae		4							
Trichoptera	Hydropsychidae		Cheumatopsyche sp.	10	8	6	6	4	1			
Trichoptera	Hydropsychidae		Diplectrona sp.	46	22	20	43	39	15	83	1	12
Trichoptera	Hydropsychidae		Hydropsyche sp.		2	7		3	1	3		

Appendix B-4. 2000 taxon list and counts

order	family	tribe	taxon name	Spring 2000								
				lower			middle			upper		
				1	2	3	1	2	3	1	2	3
Trichoptera	Limnephilidae		Limnephilidae									
Trichoptera	Limnephilidae		Hydatophylax sp.									
Trichoptera	Philopotamidae		Philopotamidae									
Trichoptera	Philopotamidae		Chimarra sp.	1	2	2						
Trichoptera	Philopotamidae		Dolophilodes sp.	10	1	3	3	1	22			
Trichoptera	Polycentropodidae		Polycentroporus sp.									
Trichoptera	Rhyacophilidae		Rhyacophila sp.	4		2	1	1			1	
Trichoptera	Uenoidae		Neophylax sp.	3	1					4		
Coleoptera	Drypidae		Helichus sp.				1					
Coleoptera	Dytiscidae		Hydroporus sp.	3			1				2	
Coleoptera	Elmidae		Optioservus sp.	3								
Coleoptera	Elmidae		Oulimnius sp.	5		1	1	2			1	
Coleoptera	Hydrophilidae		Hydrobius sp.									
Coleoptera	Hydrophilidae		Stenelmis sp.	5	2					5		
Coleoptera	Hydrophilidae		Tropisternus sp.							1		
Coleoptera	Psephenidae		Psephenus sp.	33	2	7	6	3	7	2		
Coleoptera	Psephenidae		Ectopria sp.	1	1		1		1			1
Coleoptera	Ptilodactylidae		Anchytaurus sp.		2							
Diptera			Diptera							1		
Diptera	Ceratopogonidae	Tanytarsini	Probezzia sp.								1	
Diptera	Chironomidae		Tanytarsini								1	
Diptera	Chironomidae		Tanypodinae				1	2				
Diptera	Chironomidae		Orthocladiinae									
Diptera	Chironomidae		Brillia sp.									
Diptera	Chironomidae		Conchapelopia sp.	7							1	
Diptera	Chironomidae		Diamesa sp.	1	1							
Diptera	Chironomidae		Diplocladius sp.									
Diptera	Chironomidae		Hydrobaenus sp.								1	
Diptera	Chironomidae		Limnophyes sp.							1		
Diptera	Chironomidae	Pentaneurini	Micropsectra sp.									
Diptera	Chironomidae		Parachaetocladius sp.									
Diptera	Chironomidae		Paramerina sp.									
Diptera	Chironomidae		Parametriocnemus sp.	1	1			1		4	1	

Appendix B-4. 2000 taxon list and counts

order	family	tribe	taxon name	Spring 2000								
				lower			middle			upper		
				1	2	3	1	2	3	1	2	3
Diptera	Chironomidae	Chironomini	<i>Polypedilum</i> sp.	3			2	1		2		
Diptera	Chironomidae	Tanytarsini	<i>Rheotanytarsus</i> sp.	1	1							
Diptera	Chironomidae	Tanytarsini	<i>Tanytarsus</i> sp.	5						4		
Diptera	Chironomidae		<i>Trissopelopia</i> sp.	1			5	1		3		
Diptera	Chironomidae		<i>Tvetenia</i> sp.	4			4	4	1	2		
Diptera	Chironomidae	Pentaneurini	<i>Zavrelimyia</i> sp.									
Diptera	Simuliidae		<i>Simuliidae</i>			1						
Diptera	Simuliidae		<i>Prosimulium</i> sp.									
Diptera	Simuliidae		<i>Simulium</i> sp.	1			1					
Diptera	Tipulidae		<i>Antocha</i> sp.	3		1	3					
Diptera	Tipulidae		<i>Dicranota</i> sp.						1			
Diptera	Tipulidae		<i>Tipula</i> sp.		1						1	

Appendix B-4. 2000 taxon list and counts

order	family	tribe	taxon name	Fall 2000								
				lower			middle			upper		
				1	2	3	1	2	3	1	2	3
Decapoda	Lumbriculidae		Nematoda									
	Cambaridae		Lumbriculidae									
Collembola			Collembola	1					3			
Ephemeroptera	Ameletidae		Ameletus sp.	1							1	1
Ephemeroptera	Baetidae		Baetidae	3	2	4	3	4	12			
Ephemeroptera	Ephemerellidae		Ephemerellidae				1				1	
Ephemeroptera	Ephemerellidae		Eurylophella sp.						2			
Ephemeroptera	Heptageniidae		Heptageniidae	3	1		2				1	
Ephemeroptera	Heptageniidae		Epeorus sp.						8			
Ephemeroptera	Heptageniidae		Stenacron sp.								3	
Ephemeroptera	Leptophlebiidae		Leptophlebiidae				9		1			
Ephemeroptera	Leptophlebiidae		Paraleptophlebia sp.	2		3				2	1	
Odonata	Calopterygidae		Calopteryx sp.									1
Odonata	Gomphidae		Gomphidae								1	
Plecoptera	Capniidae		Plecoptera									
Plecoptera	Capniidae		Capniidae									
Plecoptera	Capniidae		Allocapnia sp.									
Plecoptera	Leuctridae		Leuctra sp.									
Plecoptera	Nemouridae		Amphinemura sp.									
Plecoptera	Perlidae		Perlidae									
Plecoptera	Perlidae		Acroneuria sp.									
Plecoptera	Perlidae		Eccoptura sp.									
Plecoptera	Taeniopterygidae		Taeniopteryx sp.	9	8		12		7			
Megaloptera	Corydalidae		Corydalidae									
Megaloptera	Corydalidae		Nigronia sp.				2					
Megaloptera	Sialidae		Sialis sp.				1					
Trichoptera	Glossosomatidae		Glossosoma sp.	3			1		1			
Trichoptera	Hydropsychidae		Hydropsychidae						7			
Trichoptera	Hydropsychidae		Cheumatopsyche sp.				7		5			
Trichoptera	Hydropsychidae		Diplectrona sp.	61	5	3	12	1	25	2	12	5
Trichoptera	Hydropsychidae		Hydropsyche sp.	2		1	1		9			

Appendix B-4. 2000 taxon list and counts

order	family	tribe	taxon name	Fall 2000								
				lower			middle			upper		
				1	2	3	1	2	3	1	2	3
Trichoptera	Limnephilidae		Limnephilidae				1					
Trichoptera	Limnephilidae		Hydatophylax sp.				1					
Trichoptera	Philopotamidae		Philopotamidae									
Trichoptera	Philopotamidae		Chimarra sp.									
Trichoptera	Philopotamidae		Dolophilodes sp.	20						5		
Trichoptera	Polycentropodidae		Polycentroporus sp.							1		
Trichoptera	Rhyacophilidae		Rhyacophila sp.	5			1			1		
Trichoptera	Uenoidae		Neophylax sp.							2		
Coleoptera	Dryopidae		Helichus sp.									
Coleoptera	Dytiscidae		Hydroporus sp.									
Coleoptera	Elmidae		Optioservus sp.	1								
Coleoptera	Elmidae		Oulimnius sp.				6					
Coleoptera	Hydrophilidae		Hydrobius sp.		1			2				
Coleoptera	Hydrophilidae		Stenelmis sp.	1				1				
Coleoptera	Hydrophilidae		Tropisternus sp.								1	
Coleoptera	Psephenidae		Psephenus sp.	9	1	5	27	3	22			1
Coleoptera	Psephenidae		Ectopria sp.	2		1		1				4
Coleoptera	Ptilodactylidae		Anchyrtarsus sp.									
Diptera			Diptera									
Diptera	Ceratopogonidae	Tanytarsini	Probezzia sp.									
Diptera	Chironomidae		Tanytarsini									
Diptera	Chironomidae		Tanypodinae									
Diptera	Chironomidae		Orthocladiinae									
Diptera	Chironomidae	Pentaneurini	Brillia sp.									
Diptera	Chironomidae		Conchapelopia sp.	2								
Diptera	Chironomidae		Diamesa sp.	1								
Diptera	Chironomidae		Diplocladius sp.									
Diptera	Chironomidae	Tanytarsini	Hydrobaenus sp.									
Diptera	Chironomidae		Limnophyes sp.									
Diptera	Chironomidae		Micropsectra sp.	1								
Diptera	Chironomidae		Parachaetocladius sp.	3		1	1			1		
Diptera	Chironomidae	Pentaneurini	Paramerina sp.									
Diptera	Chironomidae		Parametriocnemus sp.									

Appendix B-4. 2000 taxon list and counts

order	family	tribe	taxon name	Fall 2000								
				lower			middle			upper		
				1	2	3	1	2	3	1	2	3
Diptera	Chironomidae	Chironomini	<i>Polypedilum</i> sp.									
Diptera	Chironomidae	Tanytarsini	<i>Rheotanytarsus</i> sp.									
Diptera	Chironomidae	Tanytarsini	<i>Tanytarsus</i> sp.									
Diptera	Chironomidae		<i>Trissopelopia</i> sp.									
Diptera	Chironomidae		<i>Tvetenia</i> sp.									
Diptera	Chironomidae	Pentaneurini	<i>Zavrelimyia</i> sp.				1		1			
Diptera	Simuliidae		<i>Simuliidae</i>									
Diptera	Simuliidae		<i>Prosimulium</i> sp.									
Diptera	Simuliidae		<i>Simulium</i> sp.									
Diptera	Tipulidae		<i>Antocha</i> sp.	1	2	5				1		
Diptera	Tipulidae		<i>Dicranota</i> sp.				2			2		
Diptera	Tipulidae		<i>Tipula</i> sp.	4			1					

Appendix B-5. 2001 taxon list and counts

order	family	tribe	taxon name	Spring 2001								
				lower			middle			upper		
				1	2	3	1	2	3	1	2	3
Decapoda	Naididae		Naididae								1	
	Cambaridae		Cambaridae		1	1			2			
Ephemeroptera	Baetidae		Baetidae									
Ephemeroptera	Baetidae		Baetis sp.	15	20		8	2	2		4	2
Ephemeroptera	Heptageniidae		Heptageniidae	6			1					12
Ephemeroptera	Heptageniidae		Stenacron sp.		4				5		4	
Ephemeroptera	Leptophlebiidae		Leptophlebiidae	6	9		1		1			
Ephemeroptera	Leptophlebiidae		Paraleptophlebia sp.									
Odonata	Aeshnidae		Boyeria sp.									1
Odonata	Gomphidae		Gomphidae					1	1		1	1
Odonata	Gomphidae		Stylogomphus sp.									1
Plecoptera	Leuctridae		Leuctra sp.	10	20		7	7	11	1	2	4
Plecoptera	Perlidae		Perlidae	17	28	9	26		12	2	7	5
Plecoptera	Perlidae		Acroneuria sp.									
Hemiptera	Veliidae		Microvelia sp.								1	
Hemiptera	Veliidae		Rhagovelia sp.								1	
Megaloptera	Corydalidae		Nigronia sp.									
Trichoptera	Glossosomatidae		Glossosoma sp.	1	8	2		1	1			
Trichoptera	Hydropsychidae		Hydropsychidae		15							
Trichoptera	Hydropsychidae		Cheumatopsyche sp.	7	3		9	14	5		1	6
Trichoptera	Hydropsychidae		Diplectrona sp.	20	31	1	8	27	6	2	11	38
Trichoptera	Hydropsychidae		Hydropsyche sp.	4	16	1	1			1		
Trichoptera	Lepidostomatidae		Lepidostoma sp.									
Trichoptera	Philopotamidae		Chimarra sp.									
Trichoptera	Philopotamidae		Dolophilodes sp.	8	29	1	9	10				
Trichoptera	Polycentropodidae		Polycentropus sp.		3		3	2	2			
Trichoptera	Rhyacophilidae		Rhyacophila sp.									
Trichoptera	Uenoidae		Neophylax sp.									
Coleoptera	Drypoidae		Helichus sp.									
Coleoptera	Dytiscidae		Hydroporus sp.									
Coleoptera	Elmidae		Elmidae									
Coleoptera	Elmidae		Microcylleopus sp.		3		1			1		
Coleoptera	Elmidae		Optioservus sp.								3	

Appendix B-5. 2001 taxon list and counts

order	family	tribe	taxon name	Spring 2001								
				lower			middle			upper		
				1	2	3	1	2	3	1	2	3
Coleoptera	Elmidae		Oulimnius sp.	1	7	1	3	2	3			3
Coleoptera	Hydrophilidae		Stenelmis sp.	6	4	1	1	4	2	14	2	8
Coleoptera	Psephenidae		Psephenus sp.	43	57	12	9	49	11		11	1
Coleoptera	Psephenidae		Ectopria sp.	1	4		4	1	4	5		5
Coleoptera	Ptilodactylidae		Anchyrtarsus sp.									
Diptera	Chironomidae	Chironomini	Chironomini							1	1	
Diptera	Chironomidae	Tanytarsini	Tanytarsini	2	1			3				
Diptera	Chironomidae		Tanypodinae		2					1		1
Diptera	Chironomidae		Orthocladiinae	1								1
Diptera	Chironomidae		Brillia sp.		1						1	
Diptera	Chironomidae	Pentaneurini	Conchapelopia sp.	1	5							3
Diptera	Chironomidae		Eukiefferiella sp.									
Diptera	Chironomidae	Tanytarsini	Micropsectra sp.									1
Diptera	Chironomidae		Parachaetocladius sp.									
Diptera	Chironomidae	Chironomini	Parametriocnemus sp.	2	3		1					
Diptera	Chironomidae		Polypedilum sp.		2							2
Diptera	Chironomidae	Tanytarsini	Rheotanytarsus sp.	1	4		3	1			1	1
Diptera	Chironomidae	Tanytarsini	Stempellina sp.									
Diptera	Chironomidae	Tanytarsini	Tanytarsus sp.							1		
Diptera	Chironomidae		Tvetenia sp.		3	1	1	1	1	1		1
Diptera	Chironomidae	Pentaneurini	Zavrelimyia sp.								1	
Diptera	Empididae		Empididae								1	1
Diptera	Empididae		Chelifera sp.	1	1			1	1			
Diptera	Simuliidae		Simulium sp.	2	3			1	2	1		
Diptera	Tabanidae		Tabanidae									
Diptera	Tipulidae		Antocha sp.	1			1					
Diptera	Tipulidae		Dicranota sp.				1					
Diptera	Tipulidae		Hexatoma sp.									
Diptera	Tipulidae		Pseudolimnophila sp.									
Diptera	Tipulidae		Tipula sp.				1	4	1		1	

Appendix B-5. 2001 taxon list and counts

order	family	tribe	taxon name	Fall 2001								
				lower			middle			upper		
				1	2	3	1	2	3	1	2	3
Decapoda	Naididae Cambaridae		Naididae Cambaridae						1			
Ephemeroptera	Baetidae		Baetidae	1	1	3						
Ephemeroptera	Baetidae		Baetis sp.									
Ephemeroptera	Heptageniidae		Heptageniidae									
Ephemeroptera	Heptageniidae		Stenacron sp.							5		
Ephemeroptera	Leptophlebiidae		Leptophlebiidae									
Ephemeroptera	Leptophlebiidae		Paraleptophlebia sp.		1							
Odonata	Aeshnidae		Boyeria sp.									
Odonata	Gomphidae		Gomphidae				2	1	1	2		2
Odonata	Gomphidae		Stylogomphus sp.									
Plecoptera	Leuctridae		Leuctra sp.									
Plecoptera	Perlidae		Perlidae				1					
Plecoptera	Perlidae		Acroneuria sp.	5	8	12		2	5	1		1
Hemiptera	Veliidae		Microvelia sp.					1	1			
Hemiptera	Veliidae		Rhagovelia sp.									
Megaloptera	Corydalidae		Nigronia sp.			1				1		
Trichoptera	Glossosomatidae		Glossosoma sp.									
Trichoptera	Hydropsychidae		Hydropsychidae									
Trichoptera	Hydropsychidae		Cheumatopsyche sp.	1								
Trichoptera	Hydropsychidae		Diplectrona sp.	21	42	84	2	1	27	190	36	18
Trichoptera	Hydropsychidae		Hydropsyche sp.	2	2	2				6		1
Trichoptera	Lepidostomatidae		Lepidostoma sp.									
Trichoptera	Philopotamidae		Chimarra sp.	1	1	5	1	2				
Trichoptera	Philopotamidae		Dolophilodes sp.	2	11		1	12		9		
Trichoptera	Polycentropodidae		Polycentropus sp.				1			1		
Trichoptera	Rhyacophilidae		Rhyacophila sp.	1	2							1
Trichoptera	Uenoidae		Neophylax sp.						2			
Coleoptera	Drypoidae		Helichus sp.							1	1	
Coleoptera	Dytiscidae		Hydroporus sp.								2	
Coleoptera	Elmidae		Elmidae									
Coleoptera	Elmidae		Microcylleopus sp.							2		
Coleoptera	Elmidae		Optioservus sp.									

Appendix B-5. 2001 taxon list and counts

order	family	tribe	taxon name	Fall 2001								
				lower			middle			upper		
				1	2	3	1	2	3	1	2	3
Coleoptera	Elmidae		Oulimnius sp.		2	8	3	1	9	2	1	
Coleoptera	Hydrophilidae		Stenelmis sp.	3			3	2	6	9	6	4
Coleoptera	Psephenidae		Psephenus sp.	8	10	14	5	1	19		4	
Coleoptera	Psephenidae		Ectopria sp.			1	1	3	28	2	7	15
Coleoptera	Ptilodactylidae		Anchyrtarsus sp.		1	3		1		2	6	
Diptera	Chironomidae	Chironomini	Chironomini									
Diptera	Chironomidae	Tanytarsini	Tanytarsini									
Diptera	Chironomidae		Tanypodinae									
Diptera	Chironomidae		Orthocladiinae	1	1							
Diptera	Chironomidae		Brillia sp.									
Diptera	Chironomidae	Pentaneurini	Conchapelopia sp.	1						1	1	1
Diptera	Chironomidae		Eukiefferiella sp.		1							
Diptera	Chironomidae	Tanytarsini	Micropsectra sp.									
Diptera	Chironomidae		Parachaetocladius sp.	1	3	5	2					
Diptera	Chironomidae		Parametriocnemus sp.	2	4							
Diptera	Chironomidae	Chironomini	Polypedilum sp.									
Diptera	Chironomidae	Tanytarsini	Rheotanytarsus sp.									
Diptera	Chironomidae	Tanytarsini	Stempellina sp.									
Diptera	Chironomidae	Tanytarsini	Tanytarsus sp.		1	1						
Diptera	Chironomidae		Tvetenia sp.									
Diptera	Chironomidae	Pentaneurini	Zavrelimyia sp.									
Diptera	Empididae		Empididae									
Diptera	Empididae		Chelifera sp.									
Diptera	Simuliidae		Simulium sp.									
Diptera	Tabanidae		Tabanidae				1					
Diptera	Tipulidae		Antocha sp.									
Diptera	Tipulidae		Dicranota sp.							1		
Diptera	Tipulidae		Hexatoma sp.							1		
Diptera	Tipulidae		Pseudolimnophila sp.	1				4		2		
Diptera	Tipulidae		Tipula sp.		5							2

Appendix B-6. 2002 taxon list and counts

order	family	tribe	taxon name	Spring 2002								
				lower			middle			upper		
				1	2	3	1	2	3	1	2	3
Nematomorpha	Goriodea Lumbriculidae Naididae Tubificidae		Goriodea Lumbriculidae Naididae Tubificidae	1	1		1		1			1
Gnathobdellida	Hirudinidae Sphaeridae		Placobdella sp. Sphaeridae	1								
Ephemeroptera	Baetidae		Baetidae	20	24	2	2	7	6	3	1	
Ephemeroptera	Heptageniidae		Heptageniidae								1	
Ephemeroptera	Heptageniidae		Stenacron sp.			1						
Ephemeroptera	Heptageniidae		Stenonema sp.									
Ephemeroptera	Leptophlebiidae		Leptophlebiidae						1			
Ephemeroptera	Leptophlebiidae		Paraleptophlebia sp.	3								
Odonata	Gomphidae		Gomphidae	1	5	9	2			1	7	
Odonata	Gomphidae		Stylogomphus sp.									
Plecoptera	Leuctridae		Leuctridae	4	4		1					
Plecoptera	Leuctridae		Leuctra sp.					9	13	7		
Plecoptera	Nemouridae		Nemouridae									
Plecoptera	Perlidae		Perlidae	4	29	5	1	3	5			
Plecoptera	Perlidae		Acroneuria sp.	2								
Plecoptera	Perlidae		Eccoptura sp.	1					2			
Hemiptera	Vellidae		Microvelia sp.	1			4	2				
Hemiptera	Vellidae		Rhagovelia sp.				1	3			1	1
Megaloptera	Corydalidae		Corydalidae	1								
Megaloptera	Corydalidae		Nigronia sp.									
Megaloptera	Sialidae		Sialis sp.									
Trichoptera	Glossosomatidae		Glossosoma sp.									
Trichoptera	Hydropsychidae		Hydropsychidae									
Trichoptera	Hydropsychidae		Cheumatopsyche sp.									
Trichoptera	Hydropsychidae		Diplectrona sp.	18	36	10	2	7	10	4		
Trichoptera	Hydropsychidae		Hydropsyche sp.	15	52	7						
Trichoptera	Lepidostomatidae		Lepidostoma sp.									
Trichoptera	Odontoceridae		Psilotreta sp.	1								
Trichoptera	Philopotamidae		Chimarra sp.	4	2							

Appendix B-6. 2002 taxon list and counts

order	family	tribe	taxon name	Spring 2002								
				lower			middle			upper		
				1	2	3	1	2	3	1	2	3
Trichoptera	Philopotamidae		Dolophilodes sp.	6	4		2		1	3	4	2
Trichoptera	Polycentropodidae		Neureclipsis sp.		1							
Trichoptera	Polycentropodidae		Polycentropus sp.									
Trichoptera	Psychomyiidae		Lype sp.									
Trichoptera	Rhyacophilidae		Rhyacophila sp.									
Trichoptera	Uenoidae		Neophylax sp.	2								
Coleoptera	Dryopidae		Helichus sp.			1						
Coleoptera	Elmidae		Elmidae		3	1						
Coleoptera	Elmidae		Oulimnius sp.	7	8	1		2	13			2
Coleoptera	Hydrophilidae		Hydrobius sp.				1					
Coleoptera	Hydrophilidae		Stenelmis sp.	7	9	2		3	7		1	5
Coleoptera	Psephenidae		Psephenus sp.	8	20	1	1	9	9	1		
Coleoptera	Psephenidae		Ectopria sp.	1	2	1	3	3	6	1	1	
Coleoptera	Ptilodactylidae		Anchytarsus sp.	2	1	1						4
Diptera	Ceratopogonidae		Ceratopogonidae									1
Diptera	Ceratopogonidae		Probezzia sp.									
Diptera	Chironomidae		Chironomidae									
Diptera	Chironomidae		Orthocladiinae									
Diptera	Chironomidae		Brillia sp.							1		
Diptera	Chironomidae		Chaetocadius sp.							1		
Diptera	Chironomidae	Pentaneurini	Conchapelopia sp.	1				1	1	1	1	
Diptera	Chironomidae	Orthocladiini/Metriocremini	Heterotrissocladius sp.									
Diptera	Chironomidae	Tanytarsini	Limnophyes sp.	1				1	1			
Diptera	Chironomidae	Chironomini	Micropsectra sp.									
Diptera	Chironomidae	Pentaneurini	Microtendipes sp.									
Diptera	Chironomidae		Nilotanyapus sp.					1				
Diptera	Chironomidae		Parachaetocadius sp.									
Diptera	Chironomidae		Parametriocnemus sp.	2					5		1	24
Diptera	Chironomidae	Chironomini	Phaenopsectra sp.									
Diptera	Chironomidae	Chironomini	Polypedilum sp.	1	1		1			1		2
Diptera	Chironomidae	Tanytarsini	Pseudoorthocladius sp.									
Diptera	Chironomidae	Tanytarsini	Rheotanytarsus sp.									
Diptera	Chironomidae	Tanytarsini	Tanytarsus sp.	2	1	1	1			1		

Appendix B-6. 2002 taxon list and counts

order	family	tribe	taxon name	Spring 2002								
				lower			middle			upper		
				1	2	3	1	2	3	1	2	3
Diptera	Chironomidae	Pentaneurini	<i>Thienemannimyia</i> grp.									1
Diptera	Chironomidae		<i>Trissopelopia</i> sp.								1	2
Diptera	Chironomidae		<i>Tvetenia</i> sp.							1		
Diptera	Chironomidae	Pentaneurini	<i>Zavrelimyia</i> sp.									3
Diptera	Empididae		<i>Chelifera</i> sp.					6	1	1		
Diptera	Empididae		<i>Hemerodromia</i> sp.									
Diptera	Tabanidae		<i>Chrysops</i> sp.									
Diptera	Tipulidae		<i>Tipulidae</i>									1
Diptera	Tipulidae		<i>Antocha</i> sp.				1					
Diptera	Tipulidae		<i>Dicranota</i> sp.						2			
Diptera	Tipulidae		<i>Pseudolimnophila</i> sp.									2
Diptera	Tipulidae		<i>Tipula</i> sp.	1	1			1	2	1	1	3

Appendix B-6. 2002 taxon list and counts

order	family	tribe	taxon name	Fall 2002								
				lower			middle			upper		
				1	2	3	1	2	3	1	2	3
Nematomorpha	Goriodea Lumbriculidae Naididae Tubificidae		Goriodea Lumbriculidae Naididae Tubificidae			2						
Gnathobdellida	Hirudinidae Sphaeridae		Placobdella sp. Sphaeridae		2							
Ephemeroptera	Baetidae		Baetidae									
Ephemeroptera	Heptageniidae		Heptageniidae									
Ephemeroptera	Heptageniidae		Stenacron sp.									
Ephemeroptera	Heptageniidae		Stenonema sp.									
Ephemeroptera	Leptophlebiidae		Leptophlebiidae	3	2		2	1				
Ephemeroptera	Leptophlebiidae		Paraleptophlebia sp.		4							
Odonata	Gomphidae		Gomphidae	5			1	5	1		8	1
Odonata	Gomphidae		Stylogomphus sp.	1			2					
Plecoptera	Leuctridae		Leuctridae									
Plecoptera	Leuctridae		Leuctra sp.									
Plecoptera	Nemouridae		Nemouridae									
Plecoptera	Perlidae		Perlidae	7	2	6	2	13		1		2
Plecoptera	Perlidae		Acroneuria sp.									
Plecoptera	Perlidae		Eccoptura sp.							1		
Hemiptera	Vellidae		Microvelia sp.									
Hemiptera	Vellidae		Rhagovelia sp.									
Megaloptera	Corydalidae		Corydalidae									
Megaloptera	Corydalidae		Nigronia sp.		1							1
Megaloptera	Sialidae		Sialis sp.						1			
Trichoptera	Glossosomatidae		Glossosoma sp.				1					
Trichoptera	Hydropsychidae		Hydropsychidae	9								
Trichoptera	Hydropsychidae		Cheumatopsyche sp.	2			4	2				
Trichoptera	Hydropsychidae		Diplectrona sp.	80	1	45	56	111	2	45	114	1
Trichoptera	Hydropsychidae		Hydropsyche sp.									32
Trichoptera	Lepidostomatidae		Lepidostoma sp.									
Trichoptera	Odontoceridae		Psilotreta sp.	4	3	2	1	2				
Trichoptera	Philopotamidae		Chimarra sp.									

Appendix B-6. 2002 taxon list and counts

order	family	tribe	taxon name	Fall 2002								
				lower			middle			upper		
				1	2	3	1	2	3	1	2	3
Trichoptera	Philopotamidae		Dolophilodes sp.	14	1		2	20		18	15	4
Trichoptera	Polycentropodidae		Neureclipsis sp.									
Trichoptera	Polycentropodidae		Polycentropus sp.		1	1	5					
Trichoptera	Psychomyiidae		Lype sp.									
Trichoptera	Rhyacophilidae		Rhyacophila sp.									
Trichoptera	Uenoidae		Neophylax sp.	2								1
Coleoptera	Dryopidae		Helichus sp.	1								
Coleoptera	Elmidae		Elmidae	3								
Coleoptera	Elmidae		Oulimnius sp.	6	1	3	4	6		2	3	
Coleoptera	Hydrophilidae		Hydrobius sp.									
Coleoptera	Hydrophilidae		Stenelmis sp.	1	6		1	2			4	
Coleoptera	Psephenidae		Psephenus sp.	12	5	16	12	10	1	4	5	2
Coleoptera	Psephenidae		Ectopria sp.	1		3	11	3		2	2	2
Coleoptera	Ptilodactylidae		Anchytarsus sp.	6	3	5	5	8		20	5	3
Diptera	Ceratopogonidae		Ceratopogonidae									
Diptera	Ceratopogonidae		Probezzia sp.									
Diptera	Chironomidae		Chironomidae									
Diptera	Chironomidae		Orthocladiinae									
Diptera	Chironomidae		Brillia sp.									
Diptera	Chironomidae		Chaetocadius sp.									
Diptera	Chironomidae		Conchapelopia sp.									
Diptera	Chironomidae	Pentaneurini	Heterotrissocladius sp.									
Diptera	Chironomidae	Orthocladiini/Metriocremini	Limnophyes sp.									
Diptera	Chironomidae	Tanytarsini	Micropsectra sp.									
Diptera	Chironomidae	Chironomini	Microtendipes sp.									
Diptera	Chironomidae	Pentaneurini	Nilotanypus sp.									
Diptera	Chironomidae		Parachaetocadius sp.									
Diptera	Chironomidae		Parametriocnemus sp.	1		1						
Diptera	Chironomidae	Chironomini	Phaenopsectra sp.									
Diptera	Chironomidae	Chironomini	Polypedilum sp.									
Diptera	Chironomidae	Tanytarsini	Pseudoorthocladius sp.	2								
Diptera	Chironomidae	Tanytarsini	Rheotanytarsus sp.		1							
Diptera	Chironomidae	Tanytarsini	Tanytarsus sp.					1				

Appendix B-6. 2002 taxon list and counts

order	family	tribe	taxon name	Fall 2002								
				lower			middle			upper		
				1	2	3	1	2	3	1	2	3
Diptera	Chironomidae	Pentaneurini	<i>Thienemannimyia</i> grp.						3			
Diptera	Chironomidae		<i>Trissopelopia</i> sp.	1								
Diptera	Chironomidae		<i>Tvetenia</i> sp.				1					
Diptera	Chironomidae	Pentaneurini	<i>Zavrelimyia</i> sp.									
Diptera	Empididae		<i>Chelifera</i> sp.									
Diptera	Empididae		<i>Hemerodromia</i> sp.	1								
Diptera	Tabanidae		<i>Chrysops</i> sp.	1								
Diptera	Tipulidae		<i>Tipulidae</i>	1								
Diptera	Tipulidae		<i>Antocha</i> sp.									
Diptera	Tipulidae		<i>Dicranota</i> sp.				2		1			
Diptera	Tipulidae		<i>Pseudolimnophila</i> sp.									
Diptera	Tipulidae		<i>Tipula</i> sp.		1	1	4	1			2	3

Appendix B-7. 2003 taxon list and counts

order	family	tribe	taxon name	Spring 2003								
				lower			middle			upper		
				1	2	3	1	2	3	1	2	3
	Sphaeridae		Gastropoda Hirudinea Sphaeridae				1			1		
Coleoptera	Drypoidae		Helichus sp.							1		
Coleoptera	Elmidae		Optioservus sp.	1						1	2	
Coleoptera	Elmidae		Oulimnius sp.					1				
Coleoptera	Hydrophilidae		Stenelmis sp.	1	2			3	1	2	2	2
Coleoptera	Psephenidae		Ectopria sp.						1			
Coleoptera	Psephenidae		Psephenus sp.	3	5	2		2	8		1	
Coleoptera	Ptilodactylidae		Anchyrtarsus sp.	1								
Collembola	Isotomidae		Isotomurus sp.				1					
Diptera	Ceratopogonidae		Ceratopogonidae						1			
Diptera	Chironomidae		Brillia sp.		1							
Diptera	Chironomidae		Chironomidae				1					
Diptera	Chironomidae		Corynoneura sp.	1								
Diptera	Chironomidae		Diamesa sp.									
Diptera	Chironomidae		Diamesinae									
Diptera	Chironomidae		Eukiefferiella sp.	2	2			5	2	1		
Diptera	Chironomidae		Limnophyes sp.					2				
Diptera	Chironomidae		Orthocladiinae	1						1		
Diptera	Chironomidae		Orthocladius sp.									
Diptera	Chironomidae		Parachaetocladius sp.									
Diptera	Chironomidae		Parametriocnemus sp.	4	3				1	1		
Diptera	Chironomidae		Paraphaenocladius sp.	2					1	1		
Diptera	Chironomidae		Stilocladius sp.								1	
Diptera	Chironomidae		Tanypodinae							1		
Diptera	Chironomidae		Thienemannimyia sp.	1								
Diptera	Chironomidae		Tvetenia sp.	3	5	2	1	1	1			
Diptera	Chironomidae		Microtendipes sp.				1	1				
Diptera	Chironomidae		Polypedilum sp.	3	2					6		
Diptera	Chironomidae	Pentaneurini	Conchapelopia sp.	1	1				3	3		
Diptera	Chironomidae	Tanytarsini	Stempellinella sp.			1			1			
Diptera	Chironomidae	Tanytarsini	Tanytarsini									
Diptera	Empididae		Clinocera sp.							1		
Diptera	Simuliidae		Simulium sp.									

Appendix B-7. 2003 taxon list and counts

order	family	tribe	taxon name	Spring 2003								
				lower			middle			upper		
				1	2	3	1	2	3	1	2	3
Diptera	Tipulidae		Antocha sp.							2		
Diptera	Tipulidae		Dicranota sp.							4		
Diptera	Tipulidae		Tipula sp.							2		1
Ephemeroptera	Baetidae		Acentrella sp.									
Ephemeroptera	Baetidae		Baetidae									
Ephemeroptera	Heptageniidae		Heptageniidae				1			2	1	
Ephemeroptera	Leptophlebiidae		Leptophlebiidae									
Lumbriculida	Lumbriculidae		Lumbriculidae							1		1
Odonata	Gomphidae		Gomphidae	1		2		1	6			2
Odonata	Gomphidae		Stylogomphus sp.									
Plecoptera	Leuctridae		Leuctra sp.	2	6			4				
Plecoptera	Leuctridae		Leuctridae				1			4		
Plecoptera	Nemouridae		Amphinemura sp.							1		
Plecoptera	Perlidae		Acroneuria sp.									
Plecoptera	Perlidae		Eccoptura sp.				1	1	1	1		
Plecoptera	Perlidae		Perlidae	1	1			3	2			
Trichoptera	Glossosomatidae		Glossosoma sp.									
Trichoptera	Hydropsychidae		Cheumatopsyche sp.		1							
Trichoptera	Hydropsychidae		Diplectrona sp.	11	7	14	4	1	12	3	5	10
Trichoptera	Hydropsychidae		Hydropsyche sp.									
Trichoptera	Hydropsychidae		Hydropsychidae									
Trichoptera	Philopotamidae		Dolophilodes sp.	15	3	8				2		
Trichoptera	Polycentropodidae		Polycentropus sp.					1				
Trichoptera	Rhyacophilidae		Rhyacophila sp.					1				
Tubificida	Enchytraeidae		Enchytraeidae	1								
Tubificida	Tubificidae		Spirosperma sp.	1								
Tubificida	Tubificidae		Tubificidae		1							

Appendix B-7. 2003 taxon list and counts

order	family	tribe	taxon name	Fall 2003								
				lower			middle			upper		
				1	2	3	1	2	3	1	2	3
	Sphaeridae		Gastropoda Hirudinea Sphaeridae		2							
Coleoptera	Drypoidae		Helichus sp.									
Coleoptera	Elmidae		Optioservus sp.		3							
Coleoptera	Elmidae		Oulimnius sp.			1						
Coleoptera	Hydrophilidae		Stenelmis sp.	1	4	1	1	2		1	1	2
Coleoptera	Psephenidae		Ectopria sp.							1		3
Coleoptera	Psephenidae		Psephenus sp.	6	9	31	1	7		2		1
Coleoptera	Ptilodactylidae		Anchyrtarsus sp.	1	2	36						1
Collembola	Isotomidae		Isotomurus sp.								1	
Diptera	Ceratopogonidae		Ceratopogonidae									
Diptera	Chironomidae		Brillia sp.									
Diptera	Chironomidae		Chironomidae									
Diptera	Chironomidae		Corynoneura sp.									
Diptera	Chironomidae		Diamesa sp.	6								
Diptera	Chironomidae		Diamesinae	3								
Diptera	Chironomidae		Eukiefferiella sp.	2	9	1						
Diptera	Chironomidae		Limnophyes sp.									
Diptera	Chironomidae		Orthocladiinae									
Diptera	Chironomidae		Orthocladius sp.									
Diptera	Chironomidae		Parachaetocladius sp.	6								
Diptera	Chironomidae		Parametriocnemus sp.	1								
Diptera	Chironomidae		Paraphaenocladius sp.									
Diptera	Chironomidae		Stilocladius sp.		2							
Diptera	Chironomidae		Tanypodinae									
Diptera	Chironomidae		Thienemannimyia sp.									
Diptera	Chironomidae		Tvetenia sp.	3	9	1	2	1				1
Diptera	Chironomidae	Chironomini	Microtendipes sp.									
Diptera	Chironomidae	Chironomini	Polypedilum sp.									
Diptera	Chironomidae	Pentaneurini	Conchapelopia sp.									
Diptera	Chironomidae	Tanytarsini	Stempellinella sp.									
Diptera	Chironomidae	Tanytarsini	Tanytarsini									
Diptera	Empididae		Clinocera sp.									
Diptera	Simuliidae		Simulium sp.	5	2	3						

Appendix B-7. 2003 taxon list and counts

order	family	tribe	taxon name	Fall 2003							
				lower			middle			upper	
				1	2	3	1	2	3	1	2
Diptera	Tipulidae		<i>Antocha</i> sp.	1		3					
Diptera	Tipulidae		<i>Dicranota</i> sp.								
Diptera	Tipulidae		<i>Tipula</i> sp.		2		3	1		3	7
Ephemeroptera	Baetidae		<i>Acentrella</i> sp.			1					
Ephemeroptera	Baetidae		<i>Baetidae</i>		1						
Ephemeroptera	Heptageniidae		<i>Heptageniidae</i>								
Ephemeroptera	Leptophlebiidae		<i>Leptophlebiidae</i>								
Lumbriculida	Lumbriculidae		Lumbriculidae				1				
Odonata	Gomphidae		<i>Gomphidae</i>	2				1		1	1
Odonata	Gomphidae		<i>Stylogomphus</i> sp.				1				
Plecoptera	Leuctridae		<i>Leuctra</i> sp.								
Plecoptera	Leuctridae		<i>Leuctridae</i>								
Plecoptera	Nemouridae		<i>Amphinemura</i> sp.			1					
Plecoptera	Perlidae		<i>Acroneuria</i> sp.		1	2					
Plecoptera	Perlidae		<i>Eccoptura</i> sp.	2							
Plecoptera	Perlidae		<i>Perlidae</i>	3	4	1					
Trichoptera	Glossosomatidae		<i>Glossosoma</i> sp.	1							
Trichoptera	Hydropsychidae		<i>Cheumatopsyche</i> sp.	3	11	10	2	10			
Trichoptera	Hydropsychidae		<i>Diplectrona</i> sp.	37	85	40	43	15	3	11	10
Trichoptera	Hydropsychidae		<i>Hydropsyche</i> sp.	7	11	5	1	1	1		67
Trichoptera	Hydropsychidae		<i>Hydropsychidae</i>					3			1
Trichoptera	Philopotamidae		<i>Dolophilodes</i> sp.	20	54	11	21	3		2	7
Trichoptera	Polycentropodidae		<i>Polycentropus</i> sp.	1					1	1	1
Trichoptera	Rhyacophilidae		<i>Rhyacophila</i> sp.								
Tubificida	Enchytraeidae		Enchytraeidae								
Tubificida	Tubificidae		<i>Spirosperma</i> sp.								
Tubificida	Tubificidae		Tubificidae								

Appendix B-8. 2004 taxon list and counts

order	family	tribe	taxon name	Spring 2004								
				lower			middle			upper		
				1	2	3	1	2	3	1	2	3
Coleoptera	Curculionidae		Curculionidae	1		1						
Coleoptera	Elmidae		Optioservus sp.						1			
Coleoptera	Elmidae		Oulimnius sp.	2		3	1	1	1			8
Coleoptera	Elmidae		Stenelmis sp.	5	1			1	1	2	7	15
Coleoptera	Psephenidae		Ectopria sp.	1					1	3	2	1
Coleoptera	Psephenidae		Psephenus sp.	1	6	5			1			1
Coleoptera	Ptilodactylidae		Anchytarsus sp.		20	1						
Collembola	Isotomidae		Isotomurus sp.			1						1
Decapoda	Cambaridae		Cambaridae		1							
Diptera	Chironomidae		Chaetocladius sp.									
Diptera	Chironomidae		Cricotopus sp.									
Diptera	Chironomidae		Diamesa sp.	1	1		1		1			1
Diptera	Chironomidae		Eukiefferiella sp.									
Diptera	Chironomidae		Parametriocnemus sp.									
Diptera	Chironomidae		Paraphaenocladius sp.						1			1
Diptera	Chironomidae		Tanypodinae	1					1			2
Diptera	Chironomidae		Thienemanniella sp.									
Diptera	Chironomidae		Trissopelopia sp.	1								
Diptera	Chironomidae		Tvetenia sp.	1	3		1		3		1	4
Diptera	Chironomidae	Chironomini	Microtendipes sp.									
Diptera	Chironomidae	Chironomini	Polypedilum sp.	1	1							
Diptera	Chironomidae	Tanytarsini	Rheotanytarsus sp.	3		2		2	2			
Diptera	Chironomidae	Tanytarsini	Tanytarsus sp.						1			
Diptera	Chironominae		Chironominae	3								
Diptera	Empididae		Empididae	1								
Diptera	Empididae		Hemerodromia sp.						1			
Diptera	Simuliidae		Simulium sp.				1					
Diptera	Tipulidae		Antocha sp.				1	10	3		1	
Diptera	Tipulidae		Dicranota sp.				2		6			1
Diptera	Tipulidae		Hexatoma sp.				1		1			
Diptera	Tipulidae		Tipula sp.	2			1	1		3		2
Ephemeroptera	Baetidae		Baetidae									
Ephemeroptera	Baetidae		Baetis sp.	10	11	3	2	8	8	1		2
Ephemeroptera	Heptageniidae		Heptageniidae						1	1	3	
Ephemeroptera	Leptophlebiidae		Leptophlebiidae									

Appendix B-8. 2004 taxon list and counts

order	family	tribe	taxon name	Spring 2004								
				lower			middle			upper		
				1	2	3	1	2	3	1	2	3
Hemiptera	Velliidae		<i>Microvelia</i> sp.	1						1		1
Hemiptera	Velliidae		<i>Rhagovelia</i> sp.					2				
Hoplonemertea	Prostomatidae		<i>Prostoma</i> sp.									
Limnophila	Physidae		<i>Physella</i> sp.		1							
Megaloptera	Corydalidae		<i>Corydalidae</i>				1					
Megaloptera	Corydalidae		<i>Nigronia</i> sp.									
Megaloptera	Sialidae		<i>Sialis</i> sp.	1								
Nematomorpha	Goriodea		<i>Gordiodes</i>									1
Odonata	Gomphidae		<i>Gomphidae</i>						1	1		1
Plecoptera	Leuctridae		<i>Leuctra</i> sp.	16	17	6	5	11	15	3	1	8
Plecoptera	Perlidae		<i>Acroneuria</i> sp.									
Plecoptera	Perlidae		<i>Eccoptura</i> sp.			1						
Plecoptera	Perlidae		<i>Perlesta</i> sp.		1							
Plecoptera	Perlidae		<i>Perlidae</i>	4	4		1	3	7	2	2	9
Trichoptera	Glossosomatidae		<i>Glossosoma</i> sp.	1	3		1		5			
Trichoptera	Hydropsychidae		<i>Cheumatopsyche</i> sp.	7	1	6	3	9	3	1	1	1
Trichoptera	Hydropsychidae		<i>Diplectrona</i> sp.	30	5	7	12	16	30	10	82	74
Trichoptera	Hydropsychidae		<i>Hydropsyche</i> sp.	8	7	3	7	5	71			
Trichoptera	Hydropsychidae		<i>Hydropsychidae</i>	19	2	6	11	5	38		26	12
Trichoptera	Philopotamidae		<i>Chimarra</i> sp.									
Trichoptera	Philopotamidae		<i>Dolophilodes</i> sp.	24	8	5	8	4	40	1	5	7
Trichoptera	Polycentropodidae		<i>Polycentropus</i> sp.									
Trichoptera	Psychomyiidae		<i>Lype</i> sp.									
Trichoptera	Rhyacophilidae		<i>Rhyacophila</i> sp.									
Trichoptera	Uenoidae		<i>Neophylax</i> sp.	2	4			10		1		
Tricladida	Planariidae		<i>Planariidae</i>									
Tubificida	Enchytraeidae		<i>Enchytraeidae</i>					1				
Tubificida	Naididae		<i>Naididae</i>									1
Tubificida	Naididae		<i>Nais</i> sp.									1
Tubificida	Tubificidae		<i>Tubificidae</i>					1				

Appendix B-8. 2004 taxon list and counts

order	family	tribe	taxon name	Fall 2004								
				lower			middle			upper		
				1	2	3	1	2	3	1	2	3
Coleoptera	Curculionidae		Curculionidae									
Coleoptera	Elmidae		Optioservus sp.									
Coleoptera	Elmidae		Oulimnius sp.	2	2	1	2	5	3	6	6	36
Coleoptera	Elmidae		Stenelmis sp.	3	2			4	2			19
Coleoptera	Psephenidae		Ectopria sp.					2	1	1	1	8
Coleoptera	Psephenidae		Psephenus sp.	6	15	18	2	2	8			
Coleoptera	Ptilodactylidae		Anchytarsus sp.	6	20	3	1	2	2			23
Collembola	Isotomidae		Isotomurus sp.	1								
Decapoda	Cambaridae		Cambaridae									
Diptera	Chironomidae		Chaetocladius sp.								1	1
Diptera	Chironomidae		Cricotopus sp.									
Diptera	Chironomidae		Diamesa sp.									
Diptera	Chironomidae		Eukiefferiella sp.	1				1				
Diptera	Chironomidae		Parametriocnemus sp.									
Diptera	Chironomidae		Paraphaenocladius sp.									
Diptera	Chironomidae		Tanytropidinae									
Diptera	Chironomidae		Thienemanniella sp.	2		1						
Diptera	Chironomidae		Trissopelopia sp.									
Diptera	Chironomidae		Tvetenia sp.	1			1		2			
Diptera	Chironomidae	Chironomini	Microtendipes sp.				1					
Diptera	Chironomidae	Chironomini	Polypedilum sp.	2	1	3	2	1				
Diptera	Chironomidae	Tanytarsini	Rheotanytarsus sp.	1		1	1	1	1			
Diptera	Chironomidae	Tanytarsini	Tanytarsus sp.									
Diptera	Chironominae		Chironominae									
Diptera	Empididae		Empididae									
Diptera	Empididae		Hemerodromia sp.									
Diptera	Simuliidae		Simulium sp.									
Diptera	Tipulidae		Antocha sp.									
Diptera	Tipulidae		Dicranota sp.									
Diptera	Tipulidae		Hexatoma sp.									
Diptera	Tipulidae		Tipula sp.	5	3	1	5	9		3	3	16
Ephemeroptera	Baetidae		Baetidae	2								
Ephemeroptera	Baetidae		Baetis sp.			2						
Ephemeroptera	Heptageniidae		Heptageniidae									
Ephemeroptera	Leptophlebiidae		Leptophlebiidae		2							

Appendix B-8. 2004 taxon list and counts

order	family	tribe	taxon name	Fall 2004								
				lower			middle			upper		
				1	2	3	1	2	3	1	2	3
Hemiptera	Velliidae		<i>Microvelia</i> sp.									
Hemiptera	Velliidae		<i>Rhagovelia</i> sp.									
Hoplonemertea	Prostomatidae		<i>Prostoma</i> sp.				2	1				1
Limnophila	Physidae		<i>Physella</i> sp.									
Megaloptera	Corydalidae		<i>Corydalidae</i>									
Megaloptera	Corydalidae		<i>Nigronia</i> sp.							1		
Megaloptera	Sialidae		<i>Sialis</i> sp.									
Nematomorpha	Goriodea		<i>Gordiodea</i>									4
Odonata	Gomphidae		<i>Gomphidae</i>				1	5	1	3	3	8
Plecoptera	Leuctridae		<i>Leuctra</i> sp.		1							
Plecoptera	Perlidae		<i>Acroneuria</i> sp.		1		1					
Plecoptera	Perlidae		<i>Eccoptura</i> sp.	2	3	1						
Plecoptera	Perlidae		<i>Perlesta</i> sp.									
Plecoptera	Perlidae		<i>Perlidae</i>	1		1	1	2		3	3	5
Trichoptera	Glossosomatidae		<i>Glossosoma</i> sp.			1						
Trichoptera	Hydropsychidae		<i>Cheumatopsyche</i> sp.	13	5	14	14	40	15	3	3	
Trichoptera	Hydropsychidae		<i>Diplectrona</i> sp.	38	10	86	47	82	25	65	65	53
Trichoptera	Hydropsychidae		<i>Hydropsyche</i> sp.	2		5	22	32	3			
Trichoptera	Hydropsychidae		<i>Hydropsychidae</i>	16		16	20	34		5	5	27
Trichoptera	Philopotamidae		<i>Chimarra</i> sp.	2	1		2	2				
Trichoptera	Philopotamidae		<i>Dolophilodes</i> sp.	36	3	104	94	53	6	7	7	7
Trichoptera	Polycentropodidae		<i>Polycentropus</i> sp.		4	1	1	2		1	1	2
Trichoptera	Psychomyiidae		<i>Lype</i> sp.									1
Trichoptera	Rhyacophilidae		<i>Rhyacophila</i> sp.	1								
Trichoptera	Uenoidae		<i>Neophylax</i> sp.									
Tricladida	Planariidae		<i>Planariidae</i>						1			
Tubificida	Enchytraeidae		<i>Enchytraeidae</i>									
Tubificida	Naididae		<i>Naididae</i>									
Tubificida	Naididae		<i>Nais</i> sp.									
Tubificida	Tubificidae		<i>Tubificidae</i>									

Appendix C. Metrics, Index of Biotic Integrity (IBI) Scores, Hilsenhoff Biotic Index (HBI)

Year/Season	Station	Rep	n Taxa	n EPT Taxa	n Eph Taxa	n Dip Taxa	% Ephemeroptera	% Tanytarsini	n Int Taxa	% Tolerant	% Collectors	IBI	IBI Rating	HBI
1997 Spring	lower	1	10	4	1	2	4.76		5		9.52	1.2	Very Poor	2.56
		2	14	8		2			2			1.2	Very Poor	2.61
		3	17	8	2	3	9.72		4	1.39	11.11	2.6	Poor	3.43
	middle	1	7	5	2		23.08		4			2.1	Poor	2.45
		2	13	8	3		13.11		5		8.20	1.9	Very Poor	2.44
		3	14	9	1	3	2.22		5		2.22	1.4	Very Poor	3.09
	upper	1	6	3					1	15.00	15.00	1.4	Very Poor	5.36
		2	7	3		2			3	14.29	14.29	1.7	Very Poor	3.83
		3	10	4	1	2	5.13		3	2.56	7.69	1.7	Very Poor	2.75
1998 Spring	lower	1	25	11	2	5	10.59		5	0.59	11.76	2.8	Poor	2.74
		2	13	9	1	2	3.23		2		6.45	1.2	Very Poor	4.82
		3	11	5	1	1	2.70	2.70	2	2.70	8.11	1.9	Very Poor	4.67
	middle	1	9	6		1			2			1.2	Very Poor	1.36
		2	30	13	2	10	1.55	4.15	6	7.25	18.13	3.7	Fair	4.34
		3	12	7		2			2		5.26	1.2	Very Poor	3.88
	upper	1	6	2		1		9.09		1		1.4	Very Poor	5.40
		2	7	4		1			2	0.71	2.86	1.0	Very Poor	1.88
		3	17	6	2	3	1.43					2.1	Poor	2.17
1998 Fall	lower	1	14	5		6			1	25.00	25.00	1.9	Very Poor	6.20
		2	7	2		3		6.67		13.33	13.33	1.7	Very Poor	4.88
		3	9	5	1	4	2.74		2	13.70	19.18	1.7	Very Poor	3.96
	middle	1	10	5		2			1		6.25	1.2	Very Poor	4.80
		2	5	3		1			2	12.50	12.50	1.2	Very Poor	3.60
		3	8	4	1	1	18.75		4		25.00	1.7	Very Poor	2.60
	upper	1	6	2		1			2	3.13	3.13	1.4	Very Poor	3.14
		2	16	8		1			5		6.67	1.7	Very Poor	3.70
		3	6	2	1		6.67		1			1.2	Very Poor	4.00
1999 Spring	lower	1	18	9		5		1.05	6	3.16	7.37	2.3	Poor	3.29
		2	9	7	2	1	4.88		3		4.88	1.7	Very Poor	1.00
		3	24	12	1	7	6.57	3.65	5	2.92	9.49	3.0	Fair	2.79
	middle	1	15	8	1	2	4.84	3.23	4	1.61	6.45	2.1	Poor	3.41
		2	12	6	1	2	2.04	2.04	2		4.08	1.4	Very Poor	2.54
		3	3	2					1			1.0	Very Poor	3.93
	upper	1	8	3		3		4.55	3		4.55	1.4	Very Poor	2.52
		2	6	4		1			2	10.00	10.00	1.4	Very Poor	2.90
		3	6	2		2			1			1.0	Very Poor	4.00
1999 Fall	middle	1	1									1.0	Very Poor	4.00
		2	1	1								1.0	Very Poor	2.00
		3	8	5		1						1.2	Very Poor	2.73
	upper	1	2	1								1.0	Very Poor	3.33
		2	2	1								1.0	Very Poor	5.00

Appendix C. Metrics, Index of Biotic Integrity (IBI) Scores, Hilsenhoff Biotic Index (HBI)

Year/Season	Station	Rep	n Taxa	n EPT Taxa	n Eph Taxa	n Dip Taxa	% Ephemeroptera	% Tanytarsini	n Int Taxa	% Tolerant	% Collectors	IBI	IBI Rating	HBI
2000 Spring	lower	1	32	13	2	10	3.37	2.88	8	0.96	8.17	3.4	Fair	2.89
		2	18	9		4		1.47	5		2.94	1.9	Very Poor	2.41
		3	16	10		3			7	1.37	1.37	2.1	Poor	2.52
	middle	1	20	8	1	6	4.35	1.74	6	0.87	10.43	2.6	Poor	2.12
		2	16	8	1	5	1.75		5		6.14	1.7	Very Poor	1.69
		3	9	5		1			3		1.92	1.4	Very Poor	2.38
	upper	1	19	6		9		1.83	5	0.92	3.67	2.6	Poor	1.40
		2	10	5	1	4	3.85		2		3.85	1.2	Very Poor	1.35
		3	5	2		1			2			1.0	Very Poor	1.42
2000 Fall	lower	1	21	11	4	5	5.00	0.56	9	0.56	6.11	2.8	Poor	2.31
		2	9	5	2	2	6.52		3	2.17	8.70	2.3	Poor	2.91
		3	10	5	2	2	26.92		5		38.46	2.6	Poor	3.27
	middle	1	25	14	5	7	15.49		9	0.70	19.01	3.9	Fair	3.10
		2	8	3	1	2	23.53		3	5.88	23.53	2.3	Poor	2.88
		3	23	15	5	4	19.05		9		12.70	3.0	Fair	2.55
	upper	1	2	1					1			1.0	Very Poor	2.67
		2	12	7	4	1	16.67		4		13.33	1.9	Very Poor	2.71
		3	11	4	3	5	25.00	5.00	3	15.00	40.00	3.0	Fair	4.06
2001 Spring	lower	1	22	10	3	8	17.31	1.92	5	1.28	15.38	3.2	Fair	3.62
		2	28	12	3	10	11.50	1.74	6	1.05	13.59	3.7	Fair	3.19
		3	11	5		2			4		3.85	1.4	Very Poor	3.59
	middle	1	21	10	3	5	10.10	3.03	5		12.12	2.3	Poor	2.89
		2	21	7	1	7	1.49	3.73	7	0.75	2.24	2.6	Poor	3.17
		3	20	9	3	5	10.81		5	2.70	12.16	2.6	Poor	3.18
	upper	1	9	4		2			3	3.57	3.57	1.7	Very Poor	5.12
		2	19	7	2	6	14.81	3.70	3	1.85	16.67	3.2	Fair	3.55
		3	25	6	2	10	13.46	1.92	4	1.92	3.85	3.4	Fair	3.38
2001 Fall	lower	1	11	5	1	4	2.27		4		4.55	1.4	Very Poor	2.64
		2	17	8	2	6	2.38	1.19	7	1.19	9.52	2.8	Poor	2.41
		3	19	8	1	5	1.83	0.61	7	0.61	7.32	2.3	Poor	2.25
	middle	1	12	6		1			4		4.76	1.4	Very Poor	2.85
		2	13	5		1			4			1.4	Very Poor	2.21
		3	19	7	1	3	1.72		5	0.34	2.07	2.1	Poor	2.64
	upper	1	11	2		2			4		3.39	1.2	Very Poor	3.00
		2	15	4		5			3		3.85	1.2	Very Poor	3.71
		3	6	2		2			1		1.52	1.0	Very Poor	3.12

Appendix C. Metrics, Index of Biotic Integrity (IBI) Scores, Hilsenhoff Biotic Index (HBI)

Year/Season	Station	Rep	n Taxa	n EPT Taxa	n Eph Taxa	n Dip Taxa	% Ephemeroptera	% Tanytarsini	n Int Taxa	% Tolerant	% Collectors	IBI	IBI Rating	HBI
2002 Spring	lower	1	29	11	2	7	19.49	1.69	6	0.85	23.73	3.4	Fair	3.60
		2	26	13	3	4	13.06	0.45	5	0.90	14.41	3.4	Fair	3.62
		3	17	6	2	3	7.50	2.50	3		10.00	2.3	Poor	4.04
	middle	1	19	6	1	6	5.41	5.41	2	2.70	13.51	2.8	Poor	4.00
		2	17	5	1	6	11.11	1.59	3	1.59	14.29	3.0	Fair	3.16
		3	25	8	2	10	7.00		5	1.00	15.00	3.4	Fair	3.10
	upper	1	12	4	1	5	8.33	2.78	3		13.89	1.9	Very Poor	1.92
		2	11	4	2	4	13.33	13.33	1	13.33	26.67	2.3	Poor	3.64
		3	25	5		13		14.66	5	23.28	43.97	3.4	Fair	5.17
2002 Fall	lower	1	23	8	1	6	1.83		5	0.61	5.49	2.6	Poor	2.34
		2	12	5	1	2	13.33	3.33	4		13.33	1.9	Very Poor	3.92
		3	12	5	1	2	2.33		4		3.49	1.4	Very Poor	2.74
	middle	1	19	8		4			4	2.52	3.36	2.1	Poor	3.09
		2	21	7	1	7	0.97	0.49	4		3.40	2.1	Poor	2.37
		3	7	2	1	1	11.11		1		33.33	1.7	Very Poor	3.71
	upper	1	10	4					3		3.03	1.2	Very Poor	2.38
		2	10	3		1			4			1.2	Very Poor	2.05
		3	10	4		1			4			1.2	Very Poor	2.43
2003 Spring	lower	1	19	4		9			3	9.09	25.45	2.3	Poor	3.08
		2	15	5		6			3	7.32	26.83	2.3	Poor	3.60
		3	10	4	1	3	3.03	3.03	2		9.09	1.2	Very Poor	1.89
	middle	1	7	3	1	3	7.14		1	35.71	42.86	1.9	Very Poor	5.36
		2	19	6		8		3.23	4	6.45	22.58	2.8	Poor	4.09
		3	25	8	1	12	3.03		4	3.03	10.61	2.8	Poor	3.98
	upper	1	7	3	1	1	10.00		1			1.2	Very Poor	3.67
		2	5	1					1			1.0	Very Poor	3.55
		3	10	1		6			1	9.52	19.05	1.9	Very Poor	3.95
2003 Fall	lower	1	18	7		7			4	1.94	18.45	2.6	Poor	2.64
		2	17	7	1	5	0.47		3	6.57	8.92	2.1	Poor	2.59
		3	17	8	1	5	0.64		5	1.92	7.05	2.1	Poor	3.42
	middle	1	12	5		4			2	5.00	5.00	1.7	Very Poor	2.16
		2	13	5		3			2		6.25	1.2	Very Poor	3.51
		3	2	2					1			1.0	Very Poor	3.00
	upper	1	6	2		1			1		5.88	1.0	Very Poor	3.12
		2	7	3		1			3			1.2	Very Poor	2.29
		3	13	4		2			3		1.04	1.2	Very Poor	2.35

Appendix C. Metrics, Index of Biotic Integrity (IBI) Scores, Hilsenhoff Biotic Index (HBI)

Year/Season	Station	Rep	n Taxa	n EPT Taxa	n Eph Taxa	n Dip Taxa	% Ephemeroptera	% Tanytarsini	n Int Taxa	% Tolerant	% Collectors	IBI	IBI Rating	HBI
2004 Spring	lower	1	27	11	2	9	7.43	2.03	6	1.03	8.11	2.8	Poor	2.60
	lower	2	19	11	1	3	11.34	5	15.46		2.6	Poor	3.18	
	lower	3	16	8	1	2	5.77	3.85	4		5.77	2.1	Poor	3.05
	middle	1	16	9	1	6	3.45	2.11	5	1.72	8.62	2.3	Poor	2.80
	middle	2	21	9	1	6	8.42		5	2.11	23.16	3.0	Fair	3.58
	middle	3	25	10	2	10	3.69		4	6.97	2.8	Poor	3.41	
	upper	1	12	8	2	1	6.90	2.21	4	0.74	3.45	1.9	Very Poor	3.04
	upper	2	14	7	1	4	2.21		3		1.47	2.1	Poor	2.46
	upper	3	24	7	1	7	1.26		4		6.29	2.8	Poor	2.74
2004 Fall	lower	1	21	10	1	6	1.40	0.70	4	0.70	4.20	2.6	Poor	2.44
	lower	2	17	10	1	3	2.67	0.38	6	3	2.67	1.7	Very Poor	3.53
	lower	3	17	9	1	4	0.77		3		1.15	1.9	Very Poor	1.70
	middle	1	20	9	6	4	1.43	0.45	3	0.45	0.91	2.6	Poor	1.98
	middle	2	18	8				0.36	3	0.71	1.9	Very Poor	2.90	
	middle	3	14	4				1.43	5	1.43	1.4	Very Poor	3.16	
	upper	1	11	6	2	2	2	3	3	4	1.02	1.4	Very Poor	2.13
	upper	2	11	6					3		1.02	1.4	Very Poor	2.13
	upper	3	15	6					4		0.47	1.4	Very Poor	3.05